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47TH CONGRESS, } SENATE. { EX. DOC.
1st Session. } { No. 186.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

In response to Senate Resolution of April 5, 1882, a letter from the Chief of Engineers of yesterday's date, and the accompanying copy of a report from Lieut. T. W. Symons, Corps of Engineers, embracing all the information in this Department respecting the navigable waters of the Upper Columbia River and its tributaries, and of the country adjacent thereto.

APRIL 24, 1882.—Referred to the Committee on Printing.

WAR DEPARTMENT,
Washington City, April 21, 1882.

The Secretary of War has the honor to transmit to the United States Senate, in response to the resolution of that body of the 5th instant, calling for information on the subject, a letter from the Chief of Engineers of yesterday's date, and the accompanying copy of a report from Lieut. T. W. Symons, Corps of Engineers, embracing all the information in this department respecting the navigable waters of the Upper Columbia River and its tributaries, and of the resources of the country adjacent thereto.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tem.*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C., April 20, 1882.

SIR: I have the honor to return herewith the resolution of the Senate of the 5th April, 1882, directing the Secretary of War to report to the Senate of the United States—

> Any and all information in his possession respecting the navigable waters of the Upper Columbia River and its tributaries, and the resources of the country through

which such navigable waters pass, and the character and cost of improvements required to render said Upper Columbia and its tributaries available for purposes of transportation; and, particularly, such information and data as has been collected upon said subjects by Lieut. T. W. Symons, Chief Engineer of the Department of the Columbia.

And in response to transmit a copy of the report of Lieut. T. W. Symons, Corps of Engineers, which embraces all the information in this office respecting the navigable waters of the Upper Columbia River and its tributaries, and of the resources of the country adjacent thereto.

The examination by Lieutenant Symons was made by direction and under the instructions of the commanding general, Department of the Columbia.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

WASHINGTON, D. C., *April* 3, 1882.

SIR: During the months of September and October, 1881, in compliance with orders from Brig. Gen. Nelson A. Miles, commanding Department of the Columbia, I made an examination of the Columbia River, to determine its navigability and the advisability of putting steamboats on it to be used in the transportation of troops, stores, supplies, &c.

In the prosecution of this duty I examined the river at the Little Dalles, Kettle Falls, and Grand Rapids, and traversed the river in a small boat from the last-named rapids, near the mouth of the Colville River, to the mouth of the Snake River, making as careful a survey as possible with the time and means at my disposal.

I have the honor to transmit herewith a report on the examination made, with a map of the river on a scale of 1 inch to 2 miles, and maps on a larger scale of several of the obstructions in the river.

The report embraces a description of the portion of the river examined and the lands in its vicinity, and also of the other portions of the Upper Columbia and the country drained by it and its tributaries, derived from my observations and travels during the past four years, and from a careful study of the reports and writings of others.

I have sought to show the economical relations of the Columbia to the surrounding country, and the importance of making that portion of it lying within the territory of the United States navigable as far as practicable, and have suggested a plan for so doing.

I have added to this a historical and geological account of the Columbia, and have endeavored to give a clear idea of the fertile and extensive

Great Plain composing the northern portion of the interior basin of the Columbia.

It is believed that the maps and information contained in this report will be of value in the navigation of the Columbia, in any questions which may arise in connection with the improvement of the river, to all persons who take an interest in the development and prosperity of the Northwest, and to all the civil and military agents of the government whose duties require of them a knowledge of the country embraced.

With the approval of General Miles I submit this report to you, with the request that it be published, and that 300 copies may be furnished for use in the Department of the Columbia.

Very respectfully, your obedient servant,

THOMAS W. SYMONS,
First Lieutenant Corps of Engineers.

Brig. Gen. H. G. WRIGHT,
Chief of Engineers, U. S. Army, Washington, D. C.

THE UPPER COLUMBIA RIVER,

AND THE

GREAT PLAIN OF THE COLUMBIA.

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CHAPTER I.

THE UPPER COLUMBIA RIVER ABOVE GRAND RAPIDS.

EXPLANATORY.

During the months of September and October of the year 1881 I made a voyage in a bateau down the Columbia River from the Colville Valley to Ainsworth, at the mouth of the Snake River, making as careful a survey of the river and examination of the rapids as the time and means at my disposal would permit. I also, while performing the duties required of me in the Colville Valley, made an examination of the Little Dalles, and of a portion of the river between the Little Dalles and Kettle Falls.

The country about the Columbia and its tributary streams is rapidly filling up with settlers and attaining an importance which it has never before had, and this influx of people is certain to continue for a long time to come, while there are large tracts of fine land available for settlement.

The time is not far distant when the question of water transportation on these upper portions of the river will demand the attention of the government. I therefore propose to make as careful and as full a report concerning this river, its navigability, and economic relations, and concerning the country adjoining it, as I am able to do, giving also maps of the river showing the obstructions, rocks, rapids, bars, &c., on a scale of two miles to the inch, with maps on a larger scale of some of the principal obstructions.

THE LITTLE DALLES.

The Little Dalles is situated by river fifteen miles south of the point where the Columbia crosses the British line, and about twenty-six miles above Kettle Falls.

The cañon of the Columbia is here deep and narrow, and no bottom lands lie along the river. The Dalles are caused by a contraction of the channel, the limestone bluffs which form the banks of the river projecting into the stream, and damming back the water into a deep, quiet stretch above. The fall here is inconsiderable, and I believe the place could be improved for navigation during low and medium stages of the river by clearing away some of the projecting points of the bluffs and the small rock islands in the stream. Years ago, when the excitement about the gold mines on the upper waters of the Columbia and Fraser rivers was at its height, a steamer was built here and ran from the Little Dalles up the river for a distance of about 225 miles to Death Rapids, transporting supplies and carrying passengers. This steamer, the "49," during the low stages of the water, used at times to be taken down to Kettle Falls, going through the Little Dalles, and being lined back over them. The tree was pointed out to which she used to make fast in ascending the rapids.

I estimate that the removal of 40,000 cubic yards of rock, limestone, would make a good, clear channel through which steamers could pass up and down at all stages of water. The limestone rock would be very easily worked, and could be readily disposed of.

A good portage wagon road exists now around these Little Dalles.

The road to the Little Dalles leaves Fort Colville and follows down the valley of Mill Creek to its junction with Echo Valley, up which it goes as far as Bruce's ranch. From this latter point it bears westward through a gap in the hills and reaches the Columbia River by an easy descent, and follows along its left bank to the rapids. During the old mining excitement quite a town was started here, which has been almost completely destroyed by fire, the principal vestige of its former grandeur being the numerous signs still remaining along the road telling travelers where to buy their merchandise.

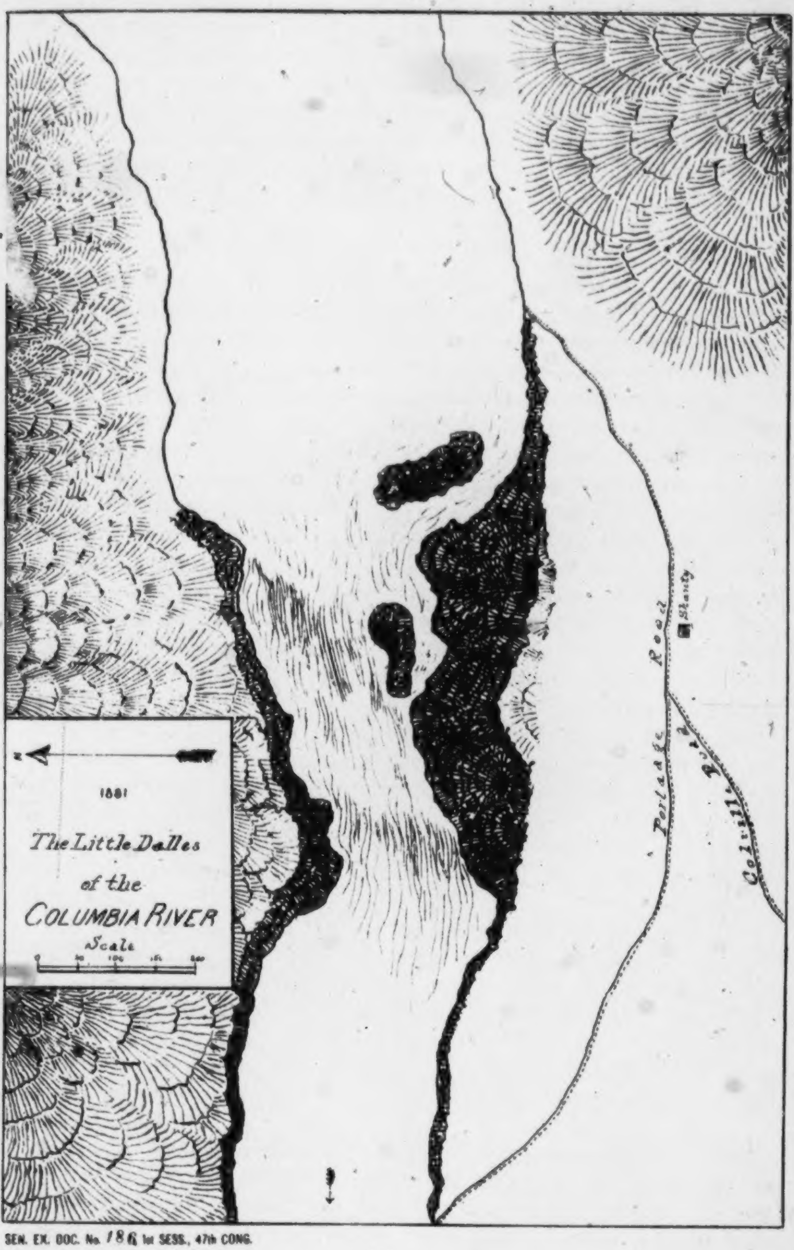
The road is very good all the way, the principal travelers over it being the Chinamen who are engaged in mining on the upper river and who go to Colville for their supplies.

COLUMBIA RIVER ABOVE THE LITTLE DALLES.

Captain Pingstone, of the Oregon Railway and Navigation Company, states that above the Little Dalles the Columbia is navigable for 280 miles to Death Rapids, and that he himself has navigated it on the steamer "49" to this point. This distance I believe to be considerably overestimated, and that it is really about 225 miles. This is the distance given by the voyageurs of the Hudson Bay Fur Company who navigated the river in their bateaux.

The country through which this navigable portion flows is mountainous as a general thing. There are, however, large areas of rather level ground, especially along the enlargements of the river known as the Arrow Lakes. I have been informed that along these Arrow Lakes lies one of the finest belts of timber known to man—cedar, white pine, and fir of large size and of the most excellent quality growing in great abundance. Upon those portions of the river beyond the navigable limit there is also a vast quantity of fine timber which will at some time in the future become very valuable and be brought to market on and in the waters of the Columbia.

Concerning the interior of the country away from the river in this extreme upper portion very little is known. From all that I can learn respecting it, it would seem certain that it is largely composed of tim-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1881
The Little Dalles
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bered and barren mountains, with here and there some fine valleys and many extensive tracts of hilly country covered with bunch-grass, and it is my belief that the climate is not so rigorous, but that it will some day be very extensively used for pastoral purposes, as well as largely brought under cultivation and made to minister to the wants of man.

It is certain that upon the upper waters of the Okinakane, from fifty to seventy-five miles to the west of the Columbia, much fine land exists, and there settlers have already found homes.

PEND D'OREILLE RIVER OR CLARKE'S FORK.

Just north of the boundary line the Columbia receives from the east the waters of the Pend d'Oreille River or Clarke's Fork of the Columbia, which is described in the lower portion of its course as being a tempestuous unnavigable stream, full of rocks, rapids, and falls, flowing through a deep and rugged cañon, discharging its waters into the Columbia with a great roar over a fall fifteen feet in height. About the headwaters of this river and Pend d'Oreille Lake immense bodies of fine timber are known to exist; many rich mines have been discovered, as well as a quarry of the finest marble. Pend d'Oreille Lake is navigable nearly throughout its entire extent and the river below the lake is reported by Dr. Suckley, in 1853, to be navigable for thirty miles, when a fall of six and a half feet is met with. Dr. Suckley, while connected with the Pacific Railroad surveys, started October 15, 1853, from Fort Owen on the Bitter Root River in a canoe made from three bullocks' hides, and a crew of two white men and an Indian. No one knew anything of the character of the river ahead of them, and it was, therefore, necessary to proceed with great caution. The Bitter Root was found quite shallow in many places, and the canoe, which, when loaded, drew only ten inches, had frequently to be lightened until he passed the Hell Gate River. About sixty miles below the mouth of the Hell Gate, the mountains crowd close upon the river, making it very rapid, but further down it is straighter, deeper, and more sluggish, with large flats on one or both sides.

The Horse Plains are just below the junction of the Flathead River with Clarke's Fork, and from this point to Saint Ignatius Mission he proceeded, passing through the lake and making two portages. He says that the Hudson Bay Company were formerly in the habit of carrying up their goods from the foot of Pend d'Oreille Lake to Horse Plains in large boats, making two portages on the way—one probably at a point nine miles above the lake, and one at the Cabinet, fifteen miles above the lake.

Below the lake there is no obstruction to navigation for about thirty miles, when a fall of six and a half feet is met with. From this fall to the point nine miles above the lake, he thinks that steamers drawing from twenty to twenty-four inches could easily ascend, and in high water the distance might be increased from sixty to one hundred miles, or from a point about ten miles below the mission to the Cabinet, fifteen miles above the lake. He says that at the falls a lock might easily be constructed so as to admit of navigation at all seasons.

At the Cabinet the river is compressed between rocks about one hundred feet in height, and becomes very rapid and narrow, so that the possibility of passing through with steamboats is uncertain.

At the mission the Fathers being deeply impressed with the unnavigability and dangers of the river below, and having an eye to his safety, refused to let Dr. Suckley have a canoe or an Indian guide, and so he did not examine the river from this point to its junction with the Columbia. He says, however, that from what information he could gather, he might have descended the river, proceeding cautiously and making portages, though the Indians were not in the habit of going by that route. This is probably the worst portion of the river for purposes of navigation.

The doctor proceeded overland to Fort Colville and embarked on the Columbia below the falls, and on the 6th day of December reached Vancouver, having gone all the way by water except such portages as were necessary.

I have never seen Dr. Suckley's narrative of his trip; it is condensed about as above in Governor Stevens' Pacific Railroad report.

Clarke's Fork in its upper portions drains a very beautiful and remarkable country—that lying between the Rocky Mountains proper and the spur known as the Bitter Root and Cœur d'Alêne Mountains. This great basin for which I would suggest the name of "*Missoula Basin*," is probably formed almost entirely by the erosion of the Great Rocky Mountain Plateau. The Rocky Mountain chain, extending to the northwestward through Wyoming, branches in the latitude of about 45° 30′; one branch extending to the east and northeast for about 90 miles; the other branch stretches to the west and northwest about 35 miles; the two branches then continue in about the same general direction to the northwest until beyond the boundary line, where they are about 135 miles apart. At about the 53d degree of latitude they come together again in the region separating the waters of the Columbia and Fraser Rivers. The western backbone of the Rocky Mountains is known by different names in different parts of its extent. The southern portion is called the Bitter Root Mountains; then comes the Cœur d'Alêne Mountains in the vicinity of Clarke's Fork, and the Cabinet Mountains forming the dividing ridge between this river and the Kootenay. Still further north it is the Selkirk Range separating the Kootenay from the Columbia, and extending along the Columbia and Canoe rivers until, at the headwaters of the latter, it merges with the main backbone.

The main range of the Rocky Mountains, which, between the sources of Snake River and the Three Forks of the Missouri, has a high altitude, and continues to be elevated along the region where the Jefferson Fork has its source, begins to fall soon after it branches to the east.

The divide, from this point, makes a great bend to the east and then a return bend to the west, forming nearly a semicircle, from which flow streams to Clarke's Fork. The semicircle commences at the Big Hole Prairie, where you pass from the Bitter Root River to the upper tributaries of Wisdom River, and may be said to end at the gates of Sun River. Its radius is eighty miles and its periphery one hundred miles, the center being near the junction of Hell Gate and Bitter Root rivers. Through this entire distance the whole chain is broken down, affording great numbers of passes, all of them having an altitude not far from 6,000 feet above the sea. Going north from the gates of Sun River the mountains rise in elevation, so that when we come to our boundary parallel the heights of the passes exceed 7,000 feet above the sea.

The country lying between the two great backbones of the Rocky Mountains, and especially that beautiful region whose streams, flowing from the great mountainous semicircle above mentioned, pass through a delightful grazing and arable country and find their confluence in the Bitter Root or Missoula River, has been ably described in the Pacific Railroad reports of Governor Stevens. As these reports are out of print and very difficult to be procured, I give the description of the country as published in these reports, only leaving out some unimportant details of the surveys and making some slight changes and additions. From the Big Hole Prairie on the south the Bitter Root River flows due north; it has a branch from the southwest known as Nez Percé Creek, up which goes a trail much used by Indians and *voyageurs* passing to the Nez Percé country and Walla Walla. This is now known as the Elk City trail. The Bitter Root Valley above Hell Gate River is about eighty miles long and from three to ten in width, having a direction north and south from the sources of Bitter Root River to its junction with the Hell Gate. Besides the outlet above mentioned to the Clearwater and Walla Walla countries, which is the most difficult, it has an excellent natural wagon-road communication at its head by the Big Hole Pass to Jefferson Fork, Fort Hall, and other points southward, as well as by the Hell Gate routes to the eastward. From the lower end of the valley it is believed that the river is, or can be made, navigable for small steamers, for long distances at least, thus affording an easy outlet for its products in the natural direction. This refers to that portion of the river now called the Missoula. Hell Gate is the *débouché* of all the considerable streams which unite with the Bitter Root eighty-five miles below its source at the Big Hole divide. The distance from Hell Gate to its junction with the Bitter Root is fifteen miles. It must not be understood by the term Hell Gate that here is a narrow passage, with perpendicular bluffs; on the contrary, it is a wide, open, and easy pass, in no case being less than a half mile wide, and the banks not subject to overflow at all. Here the Big Blackfoot joins the Hell Gate River.

The Hell Gate itself drains the semicircle of the Rocky Mountains from parallel 45° 45′ to parallel 46° 30′, a distance on the divide of eighty miles. The main tributary stream of the Hell Gate pursues nearly a northerly course for sixty-five miles, then receives the waters of the Little Blackfoot River, and continuing the general direction north fifty degrees west for forty-eight miles, receives the waters of the Big Blackfoot. The upper waters of this river, now known as Deer Lodge River, connect with the Wisdom River over a low and easy divide, over which the Northern Pacific Railroad is now being built. Moving down this valley for fifteen miles, we come to a most beautiful prairie, known as the Deer Lodge, a great resort for game and a favorite resting-place for the Indians; mild through the winter and affording inexhaustable grass the year round. The remarkable Boiling Springs are in this prairie, which is watered by many streams, those coming from the east having their sources in the Rocky Mountain divide, and those coming from the west in the low, rolling, open country between the Deer Lodge and Bitter Root rivers.

The Little Blackfoot is one of the most important streams in the line of communication through this whole mountain region; it has an open, well-grassed, and arable valley, with sweet cottonwood on the stream and pine generally on the slopes of the hills; but the forests are quite open, and both on the northern and southern sides there is much prairie country. The divides between the Little and Big Blackfoot, as well as between the former and the tributaries to the south, are low, grassed, and much of them arable. The Little Blackfoot River furnishes two outlets to the country to the east, by the southern and middle branches of Prickly Pear Creek. There is another tributary of the Little Blackfoot which may furnish a good pass to the plains of the Missouri; it comes in a little way above its junction with the Hell Gate. Passing down Hell Gate River from its junction with the Little Blackfoot, we come to several streams flowing in from the south, the principal ones being Flint and Stony Creeks. On these are prairies as large as the Deer Lodge prairie, and, in fact, the whole country between the Deer Lodge and Bitter Root consists much more of prairie than of forest land.

The Hell Gate River is thus seen to be one hundred and thirty miles long, draining the broad and fertile Deer Lodge prairie, which is estimated to contain eight hundred square miles of arable land. Then, taking a direction more transverse to the mountains, its valley continues from two to five miles wide until its junction with the Big Blackfoot at Hell Gate, after which it widens out to unite with the valley of the Bitter Root. On this part of it there are at least one hundred and fifty square miles of fine arable land in the valley, and much grazing prairie on the adjoining hills. Around the Little Blackfoot most of the country is a hilly prairie, suitable for grazing, while in the immediate valley is sufficient arable land for the subsistence of a population engaged in pastoral pursuits.

The Big Blackfoot drains the semicircle from the Hell Gate Pass to somewhat north of the Gate of Sun River, the main stream flowing from the mountains at Cadotte's and Lewis and Clarke's Passes. This stream furnishes at least four passes to the Missouri, two of which were carefully examined in the course of the explorations. The river has a general course a little south of west, winding considerably in some parts, but the length of its valley is about seventy-five miles and varying from half a mile to twelve miles in width. Neither this nor the Hell Gate can be considered navigable above their junction. Its greatest rise and fall is six feet. On the 18th of July, 1855, its water-level was from eight to twelve inches above low-water mark and five feet below high-water mark. All these streams, together with the Bitter Root River, constitute a system of waters flowing from the semicircle, uniting opposite Hell Gate, and pursuing a general northwest course to their junction with the Flathead River, forming Clarke's Fork. That portion of the river from the junction of the Bitter Root and Hell Gate rivers to the junction with the Flathead is now generally known as the Missoula River. The Flathead, coming in from the north, drains nearly as large an extent and as fine a country as the Missoula. These two systems of waters are separated by a low mountain-spur, which is generally well timbered and well watered and a large portion of the land arabel.

Passing from the Missoula to the Flathead River, we cross over this spur by a low divide, going through the Coriacan defile and coming on the waters of Jocko River. The height of this divide above the Hell Gate is 560 feet, and above the Flathead River at the mouth of the Jocko is 650 feet. From this divide a view of surpassing beauty is presented to the beholder as he looks to the northward. He sees before him an extraordinarily well-grassed, well-watered, and inviting country. On the east are the divides, clothed with pine, separating the Jocko and its tributaries from the streams flowing into the Big Blackfoot and into Flathead Lake. To the north the Flathead Lake, twenty-five miles long and six miles wide, is spread out, with extensive prairies beyond, and on the west, sloping back from the banks of the Flathead River, a mingled prairie and forest country is seen. Here, in a compact body, is one of the most promising countries in this whole region, having at least 2,000 square miles of arable land. It is now the Flathead Indian Reservation. Above the lake the Flathead River is formed by the waters of three streams. Below the lake the river follows its windings some fifty miles to its junction with the Missoula, where the united streams assume the name of Clarke's Fork. It is from 100 to 200 yards wide and so deep as to be fordable with difficulty at low-water, its depth being three feet at the shallowest places. Its current is rapid, and there is a fall of fifteen feet five miles below the lake. About eighteen miles below the lake it receives a considerable stream from the northwest, called Hot Spring Creek, in the valley of which there is a large extent of fine land. Sixteen miles further to the south it receives

Jocko River from the southeast, when it turns abruptly to the northwest and in nineteen miles joins with the Missoula. The Flathead River, by passing the rapids and falls below the lake with a short canal, gives a navigable stretch of at least seventy-five miles to the head of Flathead Lake.

The lower portions of Clarke's Fork have been already mentioned. Above the Cabinet (fifteen miles above Pend d'Oreille Lake), the river would be excellent for rafting purposes. Its greatest rise and fall is fifteen feet. The valley of Clarke's Fork is generally a wide, arable, and inviting settlement, though much of it is wooded. The prairies occupy but an inconsiderable portion of its valley and the surrounding country, yet there is no deficiency of grass. On the river are several celebrated wintering-places for Indian horses, as Horse Plains, Thompson's Prairie, and the country about Pend d'Oreille Lake.

The passes which lead from this Missoula basin to the Great Plain of the Columbia are that crossed by the Southern Nez Percé trail, now known as the Elk City trail, leading from the upper waters of the Bitter Root; the Lo Lo pass crossed by the northern Nez Percé trail, pursued by Lewis and Clarke in their great explorations, and now known as the Lou Lou trail; the Cœur d'Alêne pass, over which the Mullan road now goes; and the pass by way of Clarke's Fork.

The Southern Nez Percé trail goes up the southwest fork of the Bitter Root (Nez Percé Creek), and, crossing a dividing ridge, winds about over the summit of the high and rugged mountains separating the Kooskooskia from the Salmon River, taking a very circuitous course to the junction of the main forks of the Kooskooskia. Elevation of the pass, about 7,600 feet. This is a mere Indian trail which avoids the densely-wooded valleys and goes over the mountain summits, where the elevation prevents the growth of trees and substitutes a growth of grass. Should it be found practicable to cut a road down the valley of the Kooskooskia or Clearwater, the divide between it and the Bitter Root is still nearly 7,000 feet in altitude.

The Lou Lou trail is in character much the same, but its course is more direct. It passes up the valley of the Lou Lou fork of the Bitter Root, and, crossing to a branch of the Kooskooskia, winds along the heads of branches flowing into the main streams of this river till it comes out on the Great Plain at the same place as the southern trail. The mountain traveling required in crossing by the southern trail is about 138 miles, and by the northern trail is about 120 miles.

Between these two trails there are undoubtedly passes across the mountains much lower, but they are blocked up with fallen timber and rendered almost inaccessible on account of this and the steep, narrow valleys. It is claimed that a practicable railroad route exists by a pass called the Ska-ka-ho, or Skal-ka-ho Pass, which leaves the Bitter Root Valley nearly at its head.

The Cœur d'Alêne pass, now occupied by the Mullan road, goes from the east up the St. Regis Borgia River, crosses a divide 5,090 feet above the sea, and descends to Cœur d'Alêne Lake by way of the Cœur d'Alêne River. It is too well known to need any description.

The pass by way of Clarke's Fork crosses by the Jocko cut-off from the Missoula to the Flathead River, using the Coriacan defile, and keeps on down the Flathead River and Clarke's Fork and around Pend d'Oreille Lake. This is the route adopted by the Northern Pacific Railroad, which continues on up Hell Gate and Deer Lodge rivers and crosses to the Big Hole, or Wisdom River, by the Deer Lodge pass.

From the divide of the Rocky Mountains to the divide of the Bitter Root Mountains there is this intermediate region or Missoula Basin, over one-third of which is a cultivable area, and a large portion of it is a prairie country, instead of a wooded or mountain country. The following estimate gives the amount of arable land as far as existing information allowed it to be computed (1855):

In the region watered by the Missoula and the Bitter Root and their tributaries, not including Hell Gate, 3,000 square miles; in that watered by the Hell Gate and its tributaries, 2,500 square miles; in that watered by the Big Blackfoot and its tributaries, 1,300 square miles. The country watered by the Flathead River down to its junction with the Missoula, and thence down Clarke's Fork to the Cabinet, has a prairie region of 2,500 square miles. The country watered by the Kootenay has 2,000 square miles of prairie. Thus we have, in round numbers, 11,200 square miles of arable and prairie land.

Later determinations, based upon the land-office surveys indicate that this is not an overestimate.

Governor Stevens says that the timber land will be found unquestionably better than the prairie land; that it will not be in the immediate bottom or valley of the rivers that farmers will find their best locations, but on the smaller tributaries some few miles above their junction with the main stream. The observing and thinking man will be astonished at the conclusions which he will reach in regard to the agricultural advantages of this country. As soon as the railroads reach it and proper facilities for transportation are afforded, it will establish its superiority as an agricultural region.

THE KOOTENAY RIVER.

About twenty-five miles above the boundary there comes into the Columbia from the east the Kootenay River. The lower part of this river is unfit for navigation on account of rapids and falls, but if a short portage is made around this bad portion of the river a navigable portion is reached which is probably about 300 miles in extent.

The Kootenay rises near the fifty-first parallel of latitude, runs south to near the forty-eighth, then north and west, reaching the Columbia at about 49½° north latitude. Its course is generally through a mountainous timbered country, but with belts and sections of rich agricultural and grazing land. This country is known to be very rich in the precious metals, for the Kootenay and nearly all the streams flowing into it are gold-bearing, some of them being very rich.

Lack of public means of transportation and the difficulties and expense of prospecting have for many years deterred prospectors and miners from carrying on their work in these regions. With easy and cheap lines of transportation into the country I believe that gold and silver mining would, and should, revive and become a matter of great importance.

BELOW LITTLE DALLES.

From the Little Dalles to Kettle Falls the cañon of the Columbia is more open and much good bottom land exists along the river. In some places the hills are timberless and covered with bunch grass, and have been used for many years by the Indians of the vicinity as winter pasturage grounds for their herds of ponies. The timber along this portion of the river is not very good, being mostly bull and black pine of small size. There are some good tracts of fine timber scattered here and there, and away from the river it becomes better.

There are several good-paying gold-bearing bars along the river, especially Six-mile and Twelve-mile Bars, each of which has a wagon road leading to it from Echo Valley. The hills bordering the river are low and have an abundant depth of rich, black soil, and are undoubtedly capable of cultivation, and will be occupied and cultivated as soon as the more accessible bottom lands are taken up.

This remark holds good for the greater portion of the country between the Columbia on the west and the Pend d'Oreille on the east. Settlers will not go to the trouble of clearing off land when they can find it already fit for the plow; but land of this latter kind will not last forever; when it is gone they will have to take to the woods.

Just above Kettle Falls, on the left bank of the river, lies the valley in which the old Hudson Bay Company establishment is located. This is a fine, low-lying, fertile valley, two miles long and one mile wide, and at the northern end of it is the old fort occupied by the British boundary commissioners for two winters of the years during which they were engaged on their survey. These buildings are in a good state of preservation, and are occupied as dwellings and stores. Two traders, with quite large stocks of goods, seem to find considerable business here in trading with settlers, Chinamen, and Indians. Just across the river from the old British fort, in the Colville Indian Reservation, there is a large tract of fine arable land, some of which lies low, near the river, and some on benches and rolling hills further away. Throughout this Colville Indian Reservation there is an immense amount of as fine agricultural and grazing land as can be found anywhere in the Territory.

By far the greater proportion of the Indians for whom this reservation was set aside do not live on it, but live in the Colville and other valleys, where they have taken and claim the choicest portions for themselves. They thus act as a hinderance to the settlement of the country outside of their reservation, at the same time holding their reservation and keeping settlers away from it. Either they should be compelled to vacate their lands held outside the reservation and remove to it, or they should relinquish their reservation and allow it to be thrown open to settlement. By far the best way to settle the question is to give them complete and inalienable titles to such homesteads as they may choose to select, either on the reservation or off, and then throw open the reservation to settlement. At the same time all male Indians over twenty-one years of age should be made full citizens. As the lands outside the reserve have been ordered to be surveyed and subdivided, it is highly probable that the question will soon be settled by the Indians being removed to their reservation and made to reside upon it, unless the land in severalty plan is adopted.

GENERAL DESCRIPTION OF COUNTRY ABOUT FORT COLVILLE—THE COLVILLE VALLEY.

The Colville Valley, one of the pleasantest and finest valleys to be found anywhere in the Northwest, has been retarded in its settlement and advancement many years by the fact that it is occupied and the lands held in large quantities by Indians and half-breed descendants of the old Hudson Bay fur-traders. These people, owing to the way they have been treated and the insecure tenure on which they hold their lands, are shiftless and unprogressive, make no effort to improve and beautify, and are a stumbling-block in the way of civilization. When the land is surveyed and can be taken up according to the laws of the country, and titles be obtained, settlers will assuredly flock into the country, and Colville Valley will take the high rank that it deserves to hold among the most productive, pleasant, and beautiful regions of the earth.

An accumulation of drift and dense growth of underbrush in and along the lower portion of the Colville River has caused it during the higher stages of water to overflow its banks and inundate large areas of this valley. A small expense would remove all this obstruction and double the agricultural area of the valley, at the same time rendering it more healthy.

Fort Colville and the town of Colville are situated about fifteen miles from the Columbia, in the valley of Mill Creek, which is a branch of Colville River.

To the east of Fort Colville the hills and mountains commence, and stretch over to the Pend d'Oreille River, with here and there an attractive valley. In this direction trails lead to different points on the latter river, especially to the Calispell Lake and Mission.

The mountains are not high, are timbered, and abound in game. To the north of Fort Colville there is a pretty valley, called Echo Valley, an offshoot from Mill Creek Valley. It is bounded on the east by the same timbered mountains that lie east of Colville, and on the west by a low range of hills, partly timbered and partly covered with bunch grass; through it are one or more gaps leading to the Columbia River. Through this valley the road goes to the Little Dalles. Two roads go from Fort Colville towards the west, one down Mill Creek through Spanish Prairie, joining the other, which goes direct to the Colville River at the mouth of Mill Creek; hence they keep on together until just beyond the Catholic Mission, where they divide, one going to Rickey's Landing, below Grand Rapids, and on down the Columbia, one to Kettle Falls, and one to the old British Commission Fort Colville.

The country about the Colville River for the last few miles of its course is sandy and not fit for cultivation except in a few spots. To the south of Fort Colville the regular mail road leads to Fool's Prairie; here it branches, one branch going to Walker's Prairie and the Lower Spokane bridge, and one being the new military road to Spokane Falls. Between the Colville River and the Columbia the mountains are rather high, and are densely covered with timber as far as could be seen.

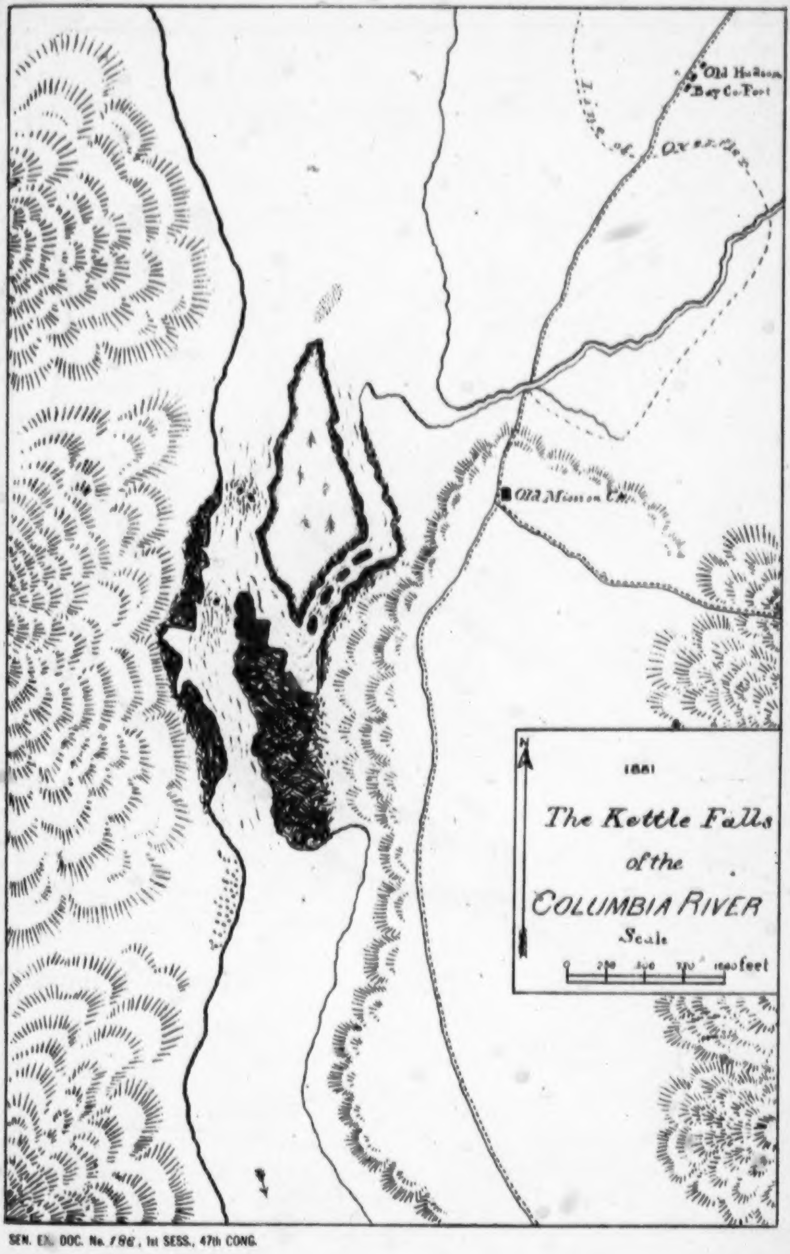
KETTLE FALLS.

Kettle Falls, the Chaudière Falls of the early Canadian *voyageurs* and the "Sometknu Falls" of the Indians, are situated about four miles above the mouth of the Colville River, sixteen miles from Fort Colville, and about 711 miles up the Columbia from its mouth. They take their name from the fact that the falling waters converge and give the pool below the appearance of a huge boiling cauldron. They are the most complete and total obstruction to navigation met with on the Columbia, the perpendicular fall being about twenty-five feet at low water, divided into the upper fall of fifteen feet, and the lower one of ten feet, the two falls being within a few rods of each other.

The channel is very much contracted by the projecting rocks and islands, as shown in the sketch of the falls accompanying this report.

If at any time in the future it should become necessary to improve or to discuss the improvement of these falls to give navigation around them, I would suggest a plan by which I think that it could be done at a comparatively small expense, owing to the peculiar conformation of the shores and islands.

A glance at the accompanying map of the falls will show that a large island lies near and parallel with the left bank. There is a channel between this island and the left bank, in which the main fall between the island and the right bank is distributed over the entire distance. This channel has at present some rocks in it which could be removed without difficulty, and has a good entrance at the upper end. Below the island is a projecting point of rock just about at the level of the highest water. Through this point a channel could be cut and in it a lock placed, the material taken from the channel being placed in the inter-



Old Hudson Bay Co. Fort
Line of Oxcarts
Old Mission Ch.
N
1881
The Kettle Falls of the COLUMBIA RIVER
Scale
0 250 500 750 1000 feet

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val between the island and projecting point, forming thus a continuous channel for a canal from the quiet waters above to the quiet waters below the falls. But Grand Rapids, another serious obstruction to navigation, lies only about seven miles below Kettle Falls, and no scheme for giving navigation around Kettle Falls would ever be entertained which did not contemplate also giving it around Grand Rapids. These

GRAND RAPIDS

present very much the same appearance as the cascades where the Columbia breaks through the Cascade Mountains. Many small black islands and points of bed-rock arise, between and around which the waters surge and toss themselves into foam, descending in a distance of about one mile a total fall of probably twenty feet.

On the right bank of the river at these falls the mountains rise rather abruptly away from the river, while along the left bank is a large, fine, open flat, about one hundred and fifty feet above the river, composed of gravel and alluvium, resting on the rock at the level of the bed of the river. This flat, which is a true river terrace, has very steep sides towards the river, and I believe that any plan to give navigation around these rapids would involve cutting a canal through this terrace and the underlying bed rock—a very expensive undertaking.

If the time ever comes that commerce shall demand navigation around these two obstructions of Grand Rapids and Kettle Falls, the method by boat railway would probably be the best one to adopt. The conformation of the ground is well suited for this purpose.

KETTLE RIVER.

This river, which is put down on nearly all maps as the "Ne-hoi-al-pit-qua" River, is known to all white people in the upper country as the Kettle River, in consequence of which, I suppose, this unpoetical name must be adopted. This river rises within a few miles of the Okinakane, and flows in a generally easterly course, emptying into the Columbia just above Kettle Falls and nearly opposite old Fort Colville. I was informed that much good country lies along this river, suitable for agricultural and grazing purposes, and that large tracts of fine timber, cedar, fir, and pine, exist in its vicinity.

As it is highly probable that in the future a line of railroad will be located along this river, I will give the words of Governor Stevens, in describing General (then Captain) McClellan's exploration of it in 1853, taken from Pacific Railroad Report:

> The country between the Okinakane and the Columbia at Fort Colville, sixty miles in a direct line across, was traversed by Captain McClellan's party about fifty miles to the north of the Great Plain. Five miles from the Okinakane, the Ne-hoi-al-pit-qua, flowing eastward, was reached, the dividing ridge being rolling and grassy, covered with forest at its summit, which is about 1,500 feet above the Okinakane and 2,647 above the sea, as observed with an aneroid barometer. The valley sloping toward the east, though narrow, is fertile, with alternations of prairie and forest, while the hills bordering it are wooded with large trees, mostly on their northern slope.

CHAPTER II.

GRAND RAPIDS TO THE SPOKANE RIVER.

PREPARATIONS FOR THE JOURNEY.

Having completed the work assigned me in the country about Fort Colville, I made preparations for my voyage down the Columbia.

I was fortunate enough to procure from John Rickey, a settler and trader, who lives at the Grand Rapids, a strongly-built bateau, and had his assistance in selecting a crew of Indians for the journey. The bateau was about thirty feet long, four feet wide at the gunwales, and two feet deep, and is as small a boat as the voyage should ever be attempted in, if it is contemplated to go through all the rapids. My first lookout had been to secure the services of "Old Pierre Agare" as steersman, and I had to carry on negotiations with him for several days before he finally consented to go. Old Pierre is the only one of the old Hudson Bay Company's Iroquois voyageurs now left who knows the river thoroughly at all stages of water, from Colville to its mouth. In the palmy days of the fur traders, he came with them from Canada, and made many voyages down and up the Columbia, married and settled at Colville, and now has a large family of children, grandchildren, and great-grandchildren about him. The old man is seventy years of age, and hale and hearty, although his eye-sight is somewhat defective, which is almost a certain accompaniment of old age with an Indian.

The other Indians engaged were Pen-waw, Big Pierre, Little Pierre, and Joseph. They had never made the trip all the way down the river, and their minds were full of the dangers and terrors of the great rapids below, and it was a long time before we could prevail upon them to go, by promising them a high price and stipulating for their return by rail and stage. Old Pierre and John Rickey labored and talked with them long and faithfully to gain their consent, and I am sure that they started off with as many misgivings about getting safely through as we did who had to trust our lives to their skill, promptness, and obedience.

When all was ready we entered the boat and took our stations, Old Pierre in the stern at the steering oar; next our baggage, upon which I took my station; then came the four Indian oarsmen, and in the bow Mr. Downing, topographical assistant. Mr. Downing and myself both worked independently in getting as thorough a knowledge of the river as possible, he taking the courses with a prismatic compass, and estimating distances by the eye, and sketching in the topographical features of the adjoining country, while I estimated also the distances to marked points, and paid particular attention to the bed of the river, sounding wherever there were any indications of shallowness.

Each evening we compared notes as to distances, and we found them to come out very well together, the greatest difference being 6¾ miles in a day's run of 64¼ miles. Some days they were identical. The total distance from our starting point, just below Grand Rapids, to Ainsworth, at the mouth of Snake River, was estimated by Mr. Downing to be 363.25 miles, and by myself to be 350 miles. His distances were obtained chiefly by estimating how far it was to some marked point ahead, and correcting it when the point was reached; mine by the time required to pass over the distances, in which the elements considered were the swiftness of the current and the labor of the oarsmen.

The following are the distances, as estimated for each day's run by Mr. Downing and myself:

Days.	Downing.	Symons.
	Miles.	*Miles.*
First	46. 25	42. 00
Second	8. 50	8. 50
Third	22. 75	23. 50
Fourth	64. 25	57. 50
Fifth	34. 60	34. 00
Sixth	56. 25	50. 00
Seventh	58. 25	62. 50
Eighth	57. 00	56 00
Ninth	15. 75	16. 00
Total	363. 25	350. 00

As a general thing, it was deemed best to use the greater estimate of the day's run in plotting the notes, and the final distance adopted was 365.5 miles.

GRAND RAPIDS TO SPOKANE RIVER.

September 29, 1881, 9:40 *a. m.*—Everything being in readiness, we pushed off, Rickey giving us his last words of advice, and the Indians, their squaws, and friends, keeping up a chaffing sort of conversation, in which they were no doubt encouraging each other to be of good cheer.

Three miles below we came to a collection of black-rock islands in the middle of the river. The islands are apparently of black basalt, and rise from thirty to fifty feet above the water at the present stage, and have a great deal of drift-wood upon their tops, and lodged in the crevices of their sides. To all appearances there is a channel on both sides of the rocks. We took the one toward the left bank, which I think is much the better. On account of the contraction caused by these islands there is quite a strong rapid here, which, however, would offer no obstacle to a good steamer. It is altogether probable that in higher stages of water the current becomes stronger, and at highest water an ordinary steamer might have some difficulty in getting through.

About nine miles further down we passed by a small village of Sans Poil Indians, on the right bank of the river. Opposite this village the river is quite shallow, the bottom covered with large gravel and bowlders, which were plainly seen from the boat. The depth is about six feet along the middle of the stream, and as the water is considerably above extreme low water, this depth would probably be decreased to four, and may be to three feet at lowest stage. There appeared some evidences of the depth being somewhat greater toward the right bank, but of this I am not certain.

Some distance below we pushed through a portion of the river containing a number of rocky-island points, sunken rocks, and points jutting out from shore. Among these rocks are several sharp little ripples with strong eddies, but nothing that can be considered as an obstruction to navigation.

At one p. m., at a distance of twenty and one-fourth miles from Rickey's Landing, we came to *Turtle Rapids*, which result from the presence in the stream of a number of large and small black-looking bed-rock islands. The main and best channel passes about in the center of the stream between the islands. The water is quite strong and rapid, but I do not consider that a steamer would have great difficulty in stemming the current at any stage of water.

In running through, care would have to be taken to avoid sunken rocks.

About three miles further, after passing a large, promising-looking bar, on which a number of Chinamen were engaged in mining, we came to another rapid, of minor importance, however, caused by a point of rock jutting well out into the stream from the left bank.

Six and one-half miles on and we came to Rogers' Bar. Both above and below this bar there are quite strong ripples, the one just above being quite shallow, with, however, sufficient water for purposes of navigation.

Four and one-half miles further on we came to what is called the *Elbow Bend* of the river. Here are some bed-rock islands with a gravel-bar island near the right bank, and jutting points of rock below, also from the right bank. The channel is near the left bank all the way, with a rather strong ripple near the rock islands.

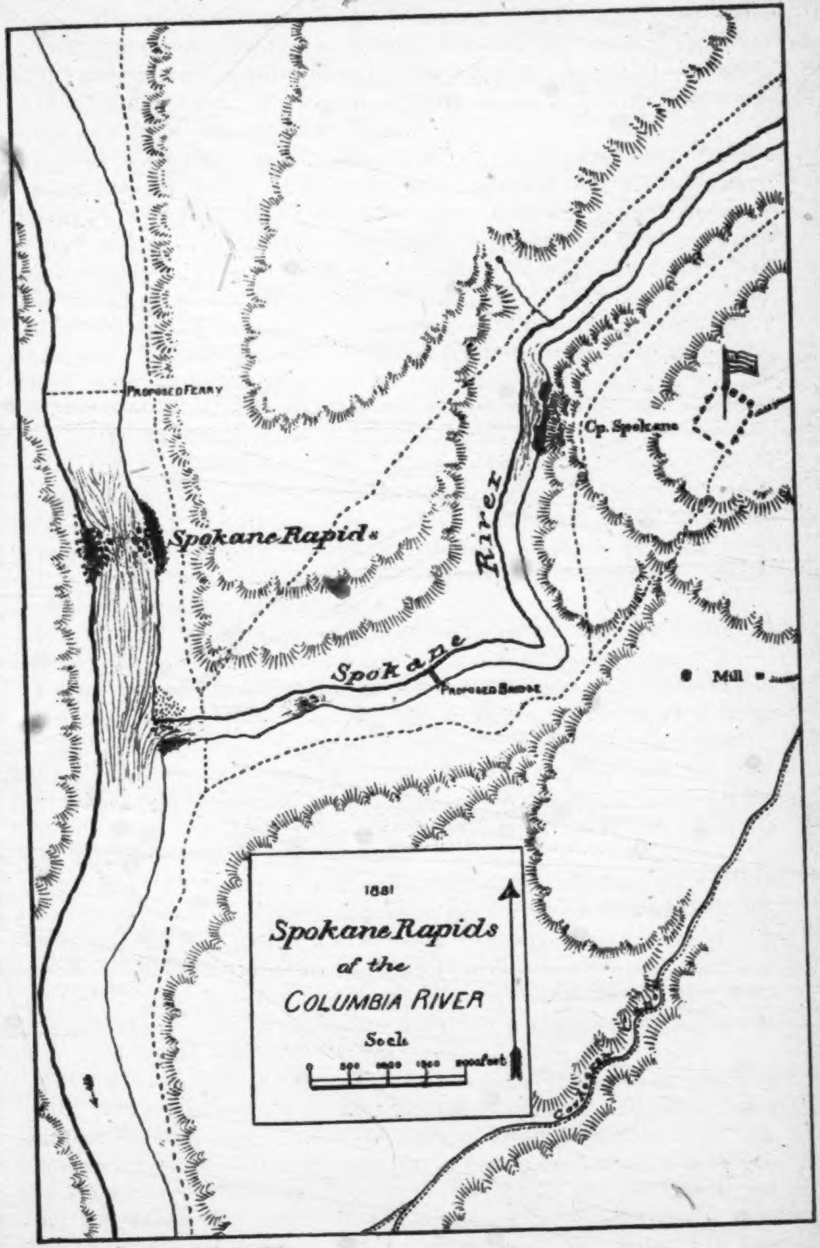
After four miles further traveling we passed some more bad water, swift and strong, with rocks near the left bank, offering, however, no obstruction to navigation; and at 4:40 we went into camp on the right bank of the river, where a pretty stream comes down, having made a distance of forty-seven and three-fourths miles during the day.

September 30, 7:28 *a. m.*—Left camp, and four miles below passed a very rugged portion of the left bank of the river. Among the rocks was one resembling very much a bishop's mitre, being conical and split down the center. I have called it *Mitre Rock*.

At 9:10, four and a half miles further on, we entered the mouth of Spokane River, and made camp, having passed through the *Spokane Rapids*, which are situated about a half mile above the mouth of the Spokane.

These rapids are the most serious obstructions to navigation met with since leaving Grand Rapids.

The river runs through a narrow channel between its two banks,


Proposed Ferry
Spokane Rapids
Spokane River
Proposed Bridge
Cp. Spokane
Mill
1881
Spokane Rapids of the COLUMBIA RIVER
Scale
0
500
1000
1500
2000 feet

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which are contracted and covered with great bowlders and massive rocks. The space free from rocks is narrow, and through it the water rushes with great velocity and power. I doubt very much if any river boat has been built in this western country that can ascend these rapids without lining over. The rapids are very short, and, with proper appliances, a boat could be easily lined over.

I think it well to consider the subject of the improvement of these Spokane Rapids, inasmuch as they are the only real obstruction to navigation for a long distance above and below them, and as their improvement would be comparatively inexpensive. Most of the bowlders forming the obstruction could be handled by an ordinary steam derrick, and removed by this means from their present position. During low water they could all be reached and taken away. No bed-rock appears that I could see. The water above the rapids is a pool, quiet, deep, and wide, which would easily stand all the quickening required to distribute the fall that now takes place through the rapids over a sufficient length of river to render it ascendable by river steamers.

For the first thirty miles below Grand Rapids, until Rogers' Bar is reached, there is considerable bottom land along the Columbia, much more than is generally believed, and on both sides of the river are benches, some of them containing hundreds of acres, perhaps thousands, of the very finest land, well watered and covered with bunch-grass and scattering belts of timber.

The Indians told me that back from the Columbia, between it and the Colville River, were many fertile and beautiful prairies.

Below Rogers' Bar the cañon narrows and the mountains close in and the river is crooked, with very little bottom land until within a few miles of the Spokane, when it becomes more open. Throughout this portion, the hills, bottom lands, and mountains are well covered with fine open timber and very little underbrush. Except where it breaks through the Cascade Mountains, this is the most beautiful portion of the Columbia within our territory.

Many beautiful and pleasant homes are certain at no very distant day to adorn its banks, and the demands of advancing civilization will certainly require that within a few years steamers should navigate its waters, communicating with railways reaching it near the mouths of the Colville and Spokane rivers. It is to be hoped that, in the years to come, this portion may become a part of a continuously navigable river from Grand Rapids to the sea.

There are quite a number of Chinamen engaged in mining on the river bars. Many bars have been worked and abandoned, and others have not been worked, owing to the difficulty of getting water to them. In some instances the Chinamen have put in flumes several miles in length and constructed quite extensive works to obtain the precious metal from the gravel and sand. In the construction of these works they often display much ingenuity and knowledge of hydraulics. In one place just below the Spokane River they have taken the water from Hawk Creek and conducted it about three miles in ditches and wooden flumes made of whip-sawed lumber, and have taken it to a large bar-island in the river, crossing the intervening channel by means of an inverted siphon, also made of whip-sawed lumber.

THE SPOKANE RIVER.

The Spokane River at its mouth is about 200 feet wide, and flows through a cañon very similar to that of the Columbia, and about 2,000 feet below the general level of the plains to the south. It is broken by many rapids and falls, and is entirely unnavigable. From its mouth up to Spokane Falls, about seventy miles, this cañon is very deep and difficult to cross or traverse. This river, with that portion of the Columbia from its mouth to the Okinakane, forms the boundary line between the rich and treeless great Columbia Plain on the south, and the more rocky, timbered, and mountainous country to the north.

Camp Spokane is situated on a level terrace plateau about one and a half miles from the mouth of the Spokane, and four hundred feet above it, on its southern bank. From this plateau it is easy to descend to the Spokane and Columbia rivers, and to ascend to the great plains to the south.

The Spokane River, by its situation and characteristics, is bound to play an important part in the settlement and ultimate well-being of the whole country within a great distance of it.

At Spokane Falls is a magnificent water-power, one of the finest in the world, and situated as it is in the midst of a splendid agricultural country, most of which, however, is treeless, there seems no room to doubt that it will become a great manufacturing and commercial center.

By means of the river and Cœur d'Alêne Lake, and the tributary streams of the latter, a magnificent and widely-extended area of timber-land lying along the Cœur d'Alêne and Bitter Root Mountains can be made to yield its forest covering for transportation by water to Spokane Falls, there to be manufactured into lumber and distributed throughout the agricultural lands to the south and west. In return for this lumber and fuel, these lands will send their wheat to the falls to be manufactured into flour, and sent from there to the seaboard to be shipped to the markets of the world.

Large portions of the country are better suited for pastoral purposes than for agricultural, and it is reasonable to expect that here at these falls will be erected great woolen manufactories, to work up the raw produce of the country into the cloths and blankets required by the inhabitants thereof.

Large quantities of brown hematite iron ore have been found near the Spokane River below the falls, and it is known that other iron deposits lie to the north.

Quantities of flax have been grown the past few years in the country to the south of Spokane Falls, and it must also be brought to this great water-power to be manufactured into thread, cloth, &c., and the seed into oil.

The number of manufacturing enterprises for which this place seems adapted is very great. I may enumerate, besides those mentioned above, the manufacture of all kinds of wooden ware, of agricultural and farm implements, wagons, carriages, furniture, leather, harness, boots and shoes, pork, beer, and iron and metal works in great variety. Large numbers of emigrants have been and are coming into this Spokane country, lured hither by the fine agricultural prospects, by the abundance of remunerative labor, the prospects of large manufacturing establishments, and the bright mining outlook. This influx of emigrants will be largely increased as soon as railroads reach the country and render it cheaper and easier for them to come.

The Spokane, in the upper part of its course, presents the estimable peculiarity—especially valuable in view of its use as a water-power—of never freezing.

It seems to be fed by many springs between the falls and Cœur d'Alêne Lake, which have the effect, in the coldest weather, of keeping the temperature above the freezing point.

Immediately about the falls the soil is not adapted to farming on a large scale, as it is more or less rocky and gravelly. It is, however, on this account, particularly well fitted for building purposes.

The total fall of the river is about one hundred and thirty feet, divided into several plunges and rapids, and broken by islands and rocks, and so situated that its entire force can be controlled and brought into use.

It would seem as if nature could not have done more to make this a great manufacturing and commercial center, and a beautiful, healthy, and attractive place.

My duties required me to remain several days about Camp Spokane, doing work and making examinations required by the department commander, among which were the location of a bridge over the Spokane River and a ferry over the Columbia, the object being to furnish facilities for the troops to cross these rivers and penetrate into the Indian country. The locations selected are marked on the map of the portion of the river about the mouth of the Spokane.

On account of the swiftness and turbulence of the water below, it was necessary to locate the ferry above the Spokane Rapids. Estimates for the bridge were sent in, and the troops have been ordered to build it.

CHAPTER III.

COLUMBIA RIVER, FROM THE SPOKANE RIVER TO LAKE CHELAN.

Having finished work about Camp Spokane on October 3, at 11:45 a. m. we pushed out from the Spokane River and took our course down the Columbia. At 12:15 we had run the five miles to the mouth of Hawk Creek, and the ranch and trading post of William Covington, generally known as "Virginia Bill." Hawk Creek heads at Cottonwood Springs on the old White Bluffs road. It is about twenty-five miles long, and flows for the greater part of the way through an extremely deep and precipitous cañon. Virginia Bill has constructed a wagon-road from the Great Plain near Cottonwood Springs to his ranch, which is an excellent road, and the best way to reach the Columbia from the upper plain with which I am familiar. There is an easy grade and a firm soil all the way, and I believe a practicable railroad route could be laid out to the river in the vicinity of this road.

The river between the Spokane and Hawk Creek is very swift and strong, the current running from six to eight miles an hour.

A couple of miles further on we passed the mouth of Welsh Creek, so named from a settler on its banks in the valley about four or five miles from the river. Some of the prettiest country in the world is situated upon Welsh Creek and its branches. There are beautiful little valleys nestled in among the rolling, timbered hills, and beyond, up on the great plain, mile after mile of bunch-grass-covered gently-sloping prairie.

The river now becomes very deeply encañoned with steep, rocky, and, in some cases, perpendicular bluffs, on one or both sides. The cañon is in many places very beautiful; the rocks composing the bluffs are many-colored, black, brown, pink, and white, and have many patches of bright red and yellow moss. To this must be added the green of the trees, of which all shades, from the darkest to the brightest, appear; the bright autumnal tints of the bushes, and beyond, above, and about all, the old gold of the withered bunch-grass shining in the sunlight.

The rocks take all imaginable forms, showing up as pinnacles, terraces, perpendicular bluffs, devils-slides, and giants' causeways, the whole forming one of the grandest, most beautiful sights in the universe. The material of which the rock is composed is all apparently of igneous origin, trachyte and basalt. With this, especially on the north side of the river, there is a great deal of volcanic tufa in a more or less friable condition.

About eight miles further on we come to the Whitestone, a noted landmark, consisting of a gigantic grayish-white rock, 500 feet high, standing perpendicularly up from the water, on the left bank of the river, and being partially detached from the rocks to the rear. It is split down the middle by some great convulsion. The Indians have a legend concerning this rock, of which the skunk is the hero.

It would seem that in the long ago a skunk, a cayote, and a rattlesnake each had a farm on the top of the Whitestone. These were the days before the skunk was as odorous as he is now, but was esteemed a good fellow and pleasant companion by other animals. As in some other small communities, jealousies, dissensions, and intrigues arose in this one. The result was that the cayote and rattlesnake took a mean advantage of the skunk one night when he was asleep, and threw him off the rock, away down into the river. He was not drowned, however, but floated on and on, far away to the south and west, until he came to the mouth of the river, where lived a great medicine-man and magician. To him the skunk applied and was fitted out with an apparatus warranted to give immunity from, and conquest over, all his enemies. Back he journeyed along the river to his old home, where he arrived, much to the surprise of the cayote and rattlesnake, and commenced to make it so pleasant for them with his pungent perfumery apparatus, the gift of the magician, that they soon left him in undisputed possession of his rocky home, which he has maintained ever since.

Opposite the Whitestone comes in Whitestone Creek from the north. Near here we came to a trading-post, on the left bank of the stream, occupied by a man named Friedlander, who carries on quite a trade with the Indians and Chinamen along the river. He reaches his place by a wagon-road from the Great Plain above, and informed me that it is an excellent road and one of the best ways of getting to the river that there is. We remained with him until 3:10, inquiring about the country, the Indians, &c., and at a distance of two miles from his place we reached *Hell Gate.* At the head of the rapids a great jutting point sticks out from the left bank, narrowing the channel; below this, in the middle of the river, is a great rock island, with the channel to the left; below and nearer the right bank are two other rock islands. These islands form a partial dam to the water and cause rapids, which commence between the jutting point and the first great island and continue for a considerable distance below the last rock island. The channel is very crooked, as will be seen by a glance at the map of this portion of the river. Although a bad place, it seems to me that a good steamer would easily ascend the rapids and go through if the proper course was taken. This course, I should say, would be to hug the north bank until nearly to the islands, then cross over to the south bank and steam well up to the jutting point of rocks, and then cross over between this jutting point and the first islands, and then around the jutting point. The only danger that a steamer would encounter coming down would be that something would happen to the steering-gear.

During a high stage of water the jutting point mentioned above becomes an island, and the currents are changed, and it probably would be a much worse place to go through than during low and medium stages.

Three miles below we passed the mouth of the *Sans Poil River.* This comes in from the north, rising in the mountains nearly due west of Kettle Falls, and flows through a region in which there is much good farming land. This word has been variously spelled, but the above I believe is correct, as it seems to be a French name applied to the Indians living along its banks, on account either of the scarcity or shortness of their hair and beard, or from the fact that they were very poor and had no furs to sell to the traders. Old Pierre told me that this latter was the origin of the word.

After passing through two ripples we went into camp, at 4:30 p. m., on the left bank near an immense spring, which came pouring out from the rocks about fifty feet above the river. This day we made about twenty-three and a half miles.

Tuesday, October 4, 7:52 a. m., we started again on our trip, having passed an uncomfortable night on account of the rain, which gave us a severe wetting. The timber has been getting scarce, and along this portion of the river very little is seen, except where some breaking away of the northern bank gives a glimpse of the distant hills, which are covered with forests.

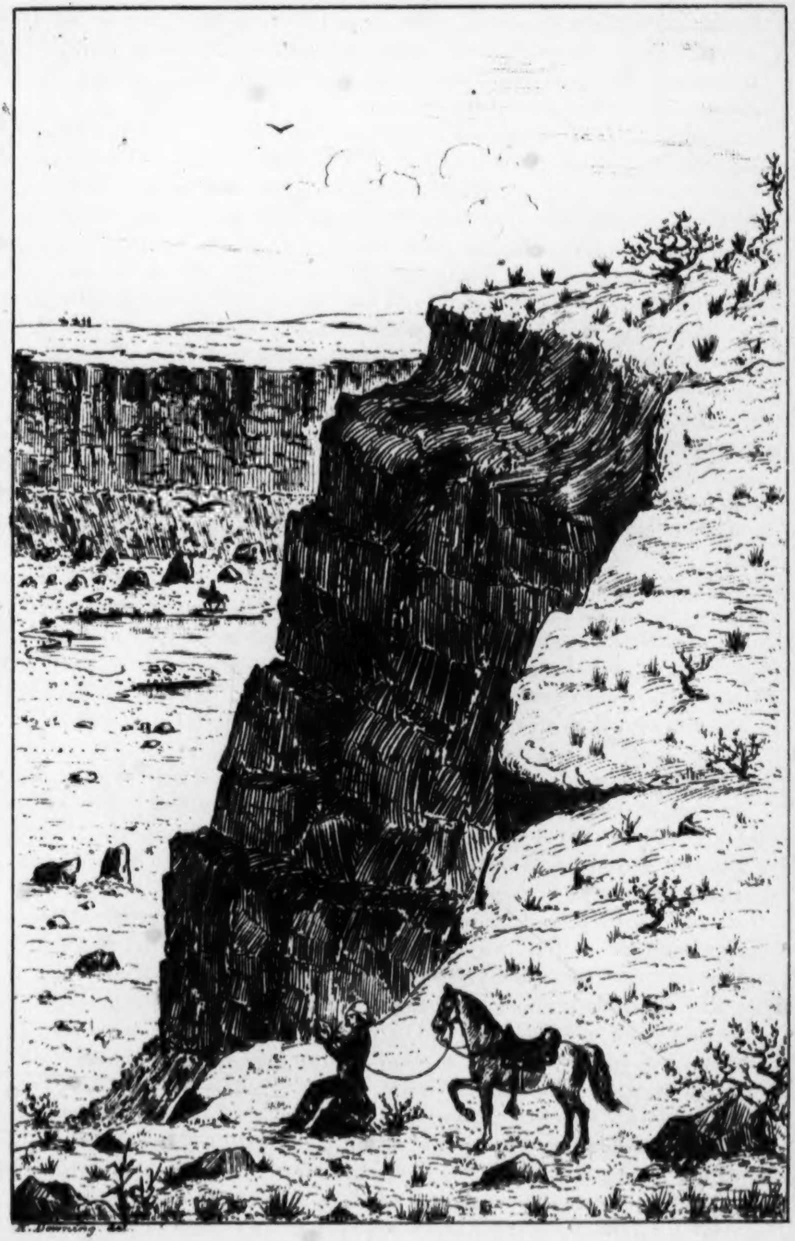
We row along very quietly and pleasantly, with an occasional ripple and rock, and now and then a bar-island and rather shallow place in the river.

10 *a. m.*—After about eleven miles are passed we come to the mouth of the Grand Coulée, which, however, would not have been noticed if old Pierre had not told us, as it presents the same appearance as the rest of the left bank, the Coulée bottom being high above the river.

Six miles further on we came to Monaghan's Rapids. These are caused by a number of small rocky islands. The channel is toward the left bank. During the early winter of 1879 and '80, James Monaghan, of Colville, one of the most enterprising men of the country, went from Colville with some rafts of lumber and supplies to the troops camped near the Okinakane. On these rocks he struck with some of his rafts and had great trouble to get off. I have named them for him. The country here, what we can see of it, presents a very weird, wild appearance. It breaks away on both sides with white cliffs in the distance, and in the foreground large black rocks, about the size of houses, scattered here and there over the brown earth, and now and then a lone, sorrowful-looking pine tree.

These isolated rocks present a very excellent example of the tremendous transporting power of moving ice. They have evidently been brought down from the upper regions of the river on floating ice, which, emerging from the cañons, has grounded with its immense loads on the gently-inclined banks of this portion of the river. The rocks are mainly basalt, of crystalline structure.

About two miles further down we come to another strong ripple, caused, as before, by rocks in the stream. One of these immense rocks


R. Downing del.

A GLIMPSE OF THE GRAND COULÉ

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seemed to be nearly spherical and to rest in an apparent state of very unstable equilibrium. These I have called Equilibrium Rapids.

Six miles further we passed the mouth of the Nespilem River. A strong ripple exists just above the mouth and a great bar-island just below. The country here is very much terraced and broken on the northern side. Down the river further, on the south bank, a large, fine bench extends along the river for several miles. It is divided into two or three terraces and covered with bunch-grass.

The river is generally very good until at about eight and a half miles further we reach Cannon or Mah-kin Rapids, which are nearly a mile long and very swift. They seem to be caused by a contraction of the water-way between the rocky banks. The water is very swift, but I think that at this season a steamer could ascend them. It would be very difficult, however, and at most seasons it would be necessary to use a line.

These rapids may be considered as the limit of navigation for a great part of the year; and a portage road built around the Great Nespilem Rapids below should embrace these Mah-kin Rapids.

This gives a stretch of river from Grand Rapids to Mah-kin Rapids, which can, I believe, generally be navigated, the only two obstructions of note being Spokane Rapids and Hell Gate.

Mah-kin Rapids are the first bad rapids of the Nespilem Cañon. The river is here contracted in width and the banks are steep and rocky. A little below, the shores are strewn with huge masses of black basaltic rock of all sizes and shapes, and this continues for several miles, forming a characteristic picture of Columbia River scenery. The complete silence and lifelessness added to the scene makes it exceedingly wild, almost unearthly. And so we plunge along swiftly through the rolling water, with huge rocks looming up, now on one side and then on the other. Every stroke of the oar is bearing us onward, nearer and nearer, to that portion of our voyage most dreaded, the terrible Kalichen Falls and Whirlpool Rapids. We hear the low rumbling of the water, and see the tops of the huge, half-sunken rocks and the white foam of the tumbling waters. For a few moments the rowing ceases, while brave old Pierre gives his orders to the Indians in their own tongue. He knows that everything depends upon his steering and their rowing or backing at the right moment, with all the strength that they possess. Years ago he was in a Hudson Bay Company bateau which capsized in these very rapids, and out of a crew of 16 men 8 perished in the water and on the rocks. The Indians make their preparations for the struggle by stripping off all their superfluous clothing, removing their gloves, and each ties a bright-colored handkerchief tightly about his head; poles and extra oars are laid ready in convenient places to reach should they become necessary, and then with a shout the Indians seize their oars, and commence laying to them with all their strength. We are rushing forward at a fearful rate, owing to the combined exertions of the Indians and the racing current, and we shudder at the thought of striking any of the huge black rocks near which we glide. Now we are fairly in the rapids, and our boat is rushing madly through the foam and billows; the Indians are shouting at every stroke in their wild savage glee; it is infectious; we shout too, and feel the wild exultation which comes to men in moments of great excitement and danger. Ugly masses of rock show their heads above the troubled waters on every side, and sunken rocks are discernible by the action of the surf. Great billows strike us fore and aft, some falling squarely over the bows and drenching us to the waist. This is bad enough, but the worst is yet to come as we draw near with great velocity to a huge rock which appears dead ahead.

Has old Pierre seen it? The water looks terribly cold as we think of his failing eyesight. Then an order, a shout, backing on one side and pulling on the other, and a quick stroke of the steering oar, and the rock appears on our right hand. Another command, and answering shout, and the oars bend like willows as the Indians struggle to get the boat out of the strong eddy into which Pierre had thrown her. Finally she shoots ahead and passes the rock like a flash, within less than an oar's length of it, and we shout for joy and breathe freely again. This eddy becomes in a high stage of water a veritable whirlpool, with the well at its center many feet in depth. Hence the name of Whirlpool Rapids.

For half a mile now the river is comparatively good, and our staunch crew rest on their oars preparatory to the next struggle, which soon comes, as some more rocky, foamy rapids are reached. Here the swells are very high and grand, and our boat at one time seems to stand almost perpendicularly. Through parts of these rapids the river is very narrow, from 300 to 400 feet, with perpendicular banks 100 to 200 feet in height.

For about nine miles further the river continues studded with rocks, and swift, with ripples every mile or so, until we reach Foster Creek Rapids. Here the rocks become thicker, being generally toward the left bank, with the channel near the right, and the water fierce and wild. For a mile more we plunge and toss through the foaming, roaring water, amid wild yells from our Indian friends, and we emerge from the Foster Creek Rapids, which appear to be as rough and dangerous as any place we have yet encountered.

We are now fairly out of the Nespilem Cañon and through all the Nespilem Rapids, and we certainly feel greatly relieved, and make for the shore and camp at the mouth of Foster Creek, where some of the companies of the Second Infantry passed, very uncomfortably, the winter of 1879–'80.

This portion of the river through which we have come to-day is the worst on the whole river, the most complete bar to navigation. From Mah-kin Rapids to Foster Creek Rapids, a distance of about twenty-seven miles, the river is exceedingly rough, with many rapids, rocks, and ripples, and a contracted, crooked channel. I had no means of determining the fall of the river in this portion of its course, but it is very great. A steamer could come down through this stretch of river, but at considerable risk; I doubt very much if a steamer could get up through it except at great expense, time, and risk.

Foster Creek is important, as it is along its course that a wagon road finds an easy descent from the level of the Great Plain to the Columbia, and by the same route a railroad will be certain, at some future day, to follow. This day's traveling we made about sixty-three miles.

October 5, we made an early start, and at 8:15 a. m. reached the Okinakane. I spent considerable time examining the country to the east of the Okinakane, and found it to consist of a large flat, covered for the most part with rich bunch grass, and the soil of black alluvial loam, although there were some patches of sandy, gravelly soil near the Columbia.

This flat embraces about four square miles, and upon the hills and bluffs to its rear there are indications of fine springs. Water could certainly be easily obtained by digging.

Further away from the river the country rises into bluffs and great terraces and plateaus, which give the promise of being fine productive land. There is a great deal of good land along the Okinakane River and in its vicinity, and good mines are known to exist. Some mines were discovered, and were claimed and worked, before the reservation along the river was set apart for Chief Moses and his people. Disputes have arisen between the miners and the Indians in regard to the right of the former to pursue their work. This has been the subject of a recent decision at Washington, that those mines which were discovered before the reservation was set apart belong to the discoverers and owners, who must not be interfered with in working them. At the mouth of the Okinakane was a camp of Indians, fine fierce-looking bucks and cleanly-looking squaws. The latter were engaged in working about the camp, cooking, making moccasins or gloves, or mending clothes, while the men were either gambling or making arrows and fishing-spears.

I went into their camp and tried to get into conversation with them, but they were very cold and surly and regarded me with suspicion, and I was reminded of the remark of Alexander Ross, an early Astorian and Northwestern fur trader, called forth by a long residence among the Indians at old Fort Okinakane and throughout the fur regions. He says:

> From Chili to Athabasca, and from Nootka to the Labrador, there is an indescribable coldness about an American savage that checks familiarity. He is a stranger to our hopes, our fears, our joys, or our sorrows; his eyes are seldom moistened by a tear or his features relaxed by a smile; and whether he basks beneath a vertical sun on the burning plains of Amazonia, or freezes in eternal winter on the ice-bound shores of the Arctic Ocean, the same piercing black eyes and stern immobility of countenance equally set at naught the skill of the physiognomist.

The following extracts are from the volume of Ross Cox, a member of the first party to visit the Okinakane, and for a long time in charge of Fort Okinakane:

I had a long summer before me; it is the most idle season of the year; and as it was intended to rebuild and fortify Okinakane during the vacation, I lost no time in setting the men to work.

The immediate vicinity is poorly furnished with timber, and our wood-cutters were obliged to proceed some distance up the river in search of that necessary article, which was floated down in rafts. We also derived considerable assistance from the immense quantities of driftwood which was intercepted in its descent down the Columbia by the great bend which that river takes above the Okinagan. Many hands made light work, and our men used such dispatch that before the month of September we had erected a new dwelling-house for the person in charge, containing four excellent rooms and a large dining hall, two good houses for the men, and a spacious store for the furs and merchandise, to which was attached a shop for trading with the natives.

The whole was surrounded by strong palisades fifteen feet high and flanked by two bastions. Each bastion had in its lower story a light brass four-pounder, and in the upper, loopholes were left for the use of musketry.

* * * * * * *

The climate of Okinagan is highly salubrious. We have for weeks together observed the blue expanse of heaven unobscured by a single cloud. Rain, too, is very uncommon; but heavy dews fall during the night.

The situation of Okinagan is admirably adapted for a trading town. With fertile soil, a healthy climate, horses in abundance for land carriage, an opening to the sea by the Columbia, and a communication to the interior by it and the Okinagan, the rivers well stocked with fish, and the natives quiet and friendly, it will in my opinion be selected as a spot pre-eminently calculated for the site of a town when civilization (which is at present so rapidly migrating towards the westward) crosses the Rocky Mountains and reaches the Columbia.

The following extract from the same book, "Adventures on the Columbia River," is given for the benefit of consumptives and as a hint to the medical fraternity. If it does not cure it certainly would be highly beneficial as a system to bring into general adoption for reasons which will be palpable to every one who loves not cur dogs.

The Okinagan mode of curing some of our diseases would probably startle many of the faculty. The following case in particular passed under my own observation:

One of the proprietors had in the year 1814 taken as a wife a young and beautiful girl whose father had been one of the early partners, and whose mother was a half-breed (her grandmother having been a native of the Cree tribe), so that, although not a pure white, she was fairer than many who are so called in Europe. He proceeded with her to Fort George, but the change of climate from the dry and healthy plains of Forts des Prairies to the gloomy forests and incessant rains on the northwest coast was too much for her delicate frame, and she fell into a deep consumption. As a last resource, her husband determined to send her to Okinagan to try the change of air, and requested me to procure her accommodation at that place for the summer. This I easily managed. She was accompanied by a younger sister and an old female attendant. She was in fact little more than a skeleton, with scarcely any symptoms of vitality, and her whole appearance betokened approaching dissolution.

Such was the state of the unfortunate patient, when an old Indian, who had for some days observed her sitting in the porch door, where she was brought, supported on pillows, to enjoy the fresh air, called me aside, and told me he had no doubt of being able to cure her provided I should agree to his plan, but added that he would not give any explanation of the means he intended to use, for fear we might laugh at him, unless we consented to adopt them. We accordingly held a consultation, the result of which was that the Indian should be allowed to follow his own method. It could not make her worse, and there was a possibility of success.

Having acquainted him with her acquiescence, he immediately commenced operations by seizing an ill-looking, snarling cur dog, which he half strangled, after which he deliberately cut its throat. He then ripped open the belly and placed the legs and feet of the patient inside, surrounded by the warm intestines, in which position he kept them until the carcass became cold. He then took them out and bandaged them with warm flannel, which he said was "very good."

The following day another dog lost its life, and a similar operation was performed. This was continued for some time until every ill-disposed cur in the village had disappeared by the throat-cutting knife of our dog-destroying doctor, and we were obliged to purchase some of a superior breed. While she was undergoing this process, she took in addition a small quantity of bark daily in a glass of port wine. In the mean time the swelling gradually decreased, the fingers lost their corpse-like nakedness, the hectic flushes became rarer, and that "most pure spirit of sense," the eyes, gave evident tokens of returning animation. When her strength permitted, she was placed on the carriage of a brass field-piece, supported by bolsters, and drawn occasionally a mile or two about the prairie.

The Indian continued at intervals to repeat this strange application until the swelling had entirely disappeared, and enabled her once more to make use of her limbs.

Two-and-thirty dogs lost their lives in bringing about this extraordinary recovery. She gradually regained possession of her appetite; and when her husband arrived in the autumn from Fort George, for the purpose of crossing the mountains, she was strong enough to accompany him. The following summer on my journey across the continent I met them at Lac la Pluie. She was in the full enjoyment of health.

The following extract from Gov. I. I. Stevens's report of the exploration of General (then Captain) G. B. McClellan is given as being of interest in connection with the Okinakane River:

On October 5, 1853, the party proceeded northward from Fort Okinakane, along the river of that name, and on the 9th reached a point in latitude 49° 26′, about thirteen miles south of the Great Lake. There is little difficulty in any part of this valley for road-making, but, as it leads to no pass westward, further exploration was not necessary.

The Hudson Bay trail to Fort Langley, on Fraser's River, leaves it about latitude 49° across a mountain ridge, to the west fork of the Okinakane, and another between that and Fraser's River. It is represented by all as barely practicable, and going directly across the mountains instead of through any pass.

The west fork (the Similkameen), near the confluence, has no valley—running through an immense ravine, impracticable for any road.

On October 12, 1853, leaving the Okinakane at the forks, they traveled eastward, crossing a high ridge to a small river (Kettle River) flowing into the Columbia, opposite Fort Colville, where they arrived on the 18th, ferrying the baggage over in canoes and swimming the animals safely over. The country traversed since leaving Fort Okinakane is thus described:

The north bank of the Columbia, between the Methow and Okinakane, is low, sandy, and barren, but rises into grassy slopes at a few miles distance, which towards their summits become covered with pine woods.

The forest evidently descends lower towards the north, and with the improving grass shows the influence of more abundant rains.

After going about twelve miles up the Okinakane, the country gradually improves in appearance, pines and cotton-woods grow more abundantly, and there is evidently a large extent both of the valley and rolling hills bordering it capable of cultivation.

At sixty miles, however, lofty wooded hills close in on its banks, and thence to the forty-ninth parallel it presents little inducement for settlement, though capable of furnishing abundance of excellent timber.

There is a fine fall on the Okinakane, thirty-five miles above its mouth, of five feet pitch, and about twenty miles further up, on its west fork, four miles above the junction, another fall of ten feet, supplying abundance of water-power. On the top of the lofty table of the Great Plain, opposite the mouth of the Okinakane, is a considerable extent of pine woods, several thousand feet above the Columbia, into which it could be easily thrown or slid down, as the cliff is almost perpendicular. This is probably the highest point of the plain, and is the point where a spur appears to cross the river and to sink into the levelof the plain.

I am strongly of the opinion that at the mouth of the Okinakane there is bound to be a commercial and manufacturing center at some time in the future, when the whole country is thrown open to settlement. There is a great deal of excellent land in its vicinity for agricultural and grazing purposes, and it is easily reached from any direction.

By striking Foster Creek at its head and following it down, a very easy and gradual descent is found to the river; thence, keeping along the left bank of the Columbia over very favorable ground until a point opposite the Okinakane is reached, is an excellent railroad route. Thence, if the Okinakane is navigable, steamers could penetrate into the interior, or, if not, a line of railroad could be built along the river, and a commerce of great extent would grow up as soon as these Indian reservations are thrown open to the public and settlers discover their attractions. The fine tracts of timber found along the Okinakane in its upper parts would furnish one of the most important articles of commerce, being floated down the river to its mouth, there to be manufactured and shipped by water down the river, or by rail, to the people settled on the Great Plain opposite. Opposite the mouth of the Okinakane the bluffs back away to a considerable distance, and leave near the river a fine flat containing from three to four square miles. The timber mentioned by Captain McClellan as covering the bluffs opposite the mouth of the river is very much exaggerated. Only a small amount exists on the slopes of the bluffs near the top, and in the gullies near the top. The appearance from the river is deceptive, and would lead any one to believe that there was considerable timber there; but personal examinations made by me in 1879 disprove this. There were no white people living anywhere in the vicinity where I passed.

About nine miles from the Okinakane the Methow River comes in from the northwest. The country on the right bank of the Columbia between these two rivers consists of a succession of nearly level benches or terraces, some having very fertile and rich soil, and others being composed largely of sand drifts. These benches stretch away from the river to the timber, which appears on the higher grounds about 6 or 7 miles to the rear.

The Methow River is a stream of considerable size, being fordable only at the lower stages of water. It shows evidence that during high water it becomes a terrible torrent—deep, wide, and swift. The country in its vicinity is strewn with great bowlders, which extend into the Columbia River, being the principal cause of the Methow Rapids, which here form an impediment to the navigation of the Columbia. These rapids are not bad enough to prevent steamers from going up or down, at any rate during low and medium stages of water, although the water is very swift. It is highly probable that during high water steamers might not be able to ascend without the use of a line.

The river between the Okinakane and Methow is very good for steamboating, with the exception perhaps of a bar situated at a bend of the river about two miles below the Okinakane. Upon this bar there was about seven feet of water when we passed over it, which depth would probably be reduced to about three or four feet at extreme low water.

Captain McClellan's report speaks of the Methow in this fashion:

> The Methow River, which was explored nearly to its sources, has a considerable extent of good agricultural and grazing land in its upper valley. Its lower part, for twenty miles up, is hemmed in by high wooded hills; above this, they become more rolling and grassy, and its banks are bordered by level wide terraces of better soil than those on the Yakima.

I have understood that quite a number of Indians live in the Upper Methow Valley.

After two and a half hours more of pleasant traveling through a good river, with a swift and even current, and here and there a little ripple and sand-bar island, we reached the river landing opposite Lake Chelan, and made camp among our old friends the Chelan Indians, whose principal village is located here. In-no-mo-setch-a, the chief, is an old man, and is one of the best Indians that it has ever been my lot to meet. The highest character is given him by all who know him, for honesty, sobriety, entire trustworthiness, and a cheerful desire to give everybody all the assistance in his power. He was absent when we arrived, but soon returned. His oldest son, "Bill," however, met us with apparent joy and did all he could to make us comfortable. He had been unfortunate of late in getting into a fight with another Indian, who had cut his nose almost completely off his face. He had it all plastered up with some kind of pitch ointment that the Indians prepared, but he will be a noseless Indian for the remainder of his life.

Chelan Creek comes into the Columbia about one mile below the Indian village; it is about two and a half miles long from the lake to its mouth, in which distance it has a fall of about 250 feet.

I first visited Lake Chelan in the summer of 1879, when searching for a site for a military post in its vicinity. Colonel Merriam of the Second Infantry, and I, with In-no-mo-setch-a and one of his sons, paddled about twenty-four miles up the lake in a dug-out canoe, and found that the farther up we went the more grand and beautiful the scenery became. About its mouth there is a large area of arable prairie land. The hills in the vicinity are covered with trees, and the lake shores, with the exception of those near the outlet, are completely timbered. The shores are in places exceedingly steep, the granite walls rising smooth and shiny, without a tree or blade of grass, for a thousand feet or more from the water's edge.

Numbers of beautiful little streams put into the lake, and generally about their mouths there is a fine series of flats or benches. One which I recall to mind on the south shore of the lake, about twelve miles from the mouth, is one of the most beautiful places that I have ever seen. Fine timber exists along the lake, and can easily be cut and put in it and brought down to its mouth. Colonel Merriam afterward went further up the lake, and says that the timber becomes better and better as the lake is ascended, and cedar is foudn about the head of it, which region he describes as being wonderfully grand. At the extreme upper end he found solid vertical walls of rock, and on these, several hundred feet above the water's edge, were a large number of hieroglyphics written on a horizontal line, evidently by people in boats when the waters were at this higher level. Above the first line were others at varying altitudes, but always in a horizontal line. The present Chelan Indians could tell nothing about them, but said that they must have been made by people who lived there long before they came there to reside.

I hope during the coming summer to go up the lake and examine and sketch these aged marks. Perhaps it may be possible to interpret them, and thus gain a link in the chain of the history of the aborigines of this country. Similar marks are said to exist in a rocky point on Lake Pend d'Oreille, which the Indians regard with superstitious awe, never going by them, believing that they form the outward token and sign of the evil spirit, who will punish them if they go near.

In the spring of 1880, the troops which had been encamped at the mouth of Foster Creek for the winter, removed to Lake Chelan, and Camp Chelan was established just where the lake narrows into the creek, on a beautiful bunch-grass-covered plateau on the north bank, stretching back about a mile to the rocky and timbered hills. Here the work of erecting a saw-mill and building the post was carried on with vigor and rapidity, considering that everything had to be done by the labor of the troops, with a very little assistance from outside.

Temporary dwellings had to be erected, brick made, logs cut and brought down and made into lumber at a temporary mill, the saw-mill built, roads made from the river up the steep bluffs to the lake, and a thousand other things done which can only be appreciated by those who have to build a post in the wilderness, hundreds of miles away from any point of supplies. The chief drawbacks to this post were the terrible road getting down to the river from the Great Plain on the east, the descent being about 2,500 feet; the crossing of the river where there was quite a swift current; and the ascent of the hill to the lake. All these drawbacks so impressed themselves upon the mind of General Schriver, inspector-general of the division, that he reported very strongly against the location, and recommended that it be abandoned and some other point selected for a post. This was done, and the present site of Camp Spokane was selected.

While the troops were in this vicinity and in constant intercourse with the Indians, the condition of the latter visibly improved; they learned to do many things in the mechanic arts that they had not known before; they were willing to work and many of them earned considerable sums of money, and a feeling of desire to labor and prosper, and lay up for the future, was rapidly taking the place of the old careless improvidence.

Procuring a couple of ponies from the Indians, Mr. Downing and myself went up the steep road and over the plain to pay a visit to the lake and the old camp. Everything was about as the troops had left it, and it certainly presented a sorrowful appearance, with its tent and shanty frames standing, the deserted sutler's store, and old tin cans and commissary boxes innumerable. There was quite an amount of lumber piled up in good condition, and everything was untouched and undisturbed by the Indians; not an Indian was visible except an old squaw, who had been to some point up the lake and gathered a large basket of elderberries which she was carrying home on her head. The Indians could make themselves very comfortable in some of the deserted buildings if they were so minded, but they prefer their homes on the river at the foot of the bluffs, where fine springs gush out and they have rich, productive gardens.

During the night our sleep was disturbed by the howlings and moanings of an old medicine man, who was performing his hideous incantations over a poor girl nearly dead with the consumption. They did not seem to know of the Okinakane dog cure of consumption, or did not wish to spare their dogs for this purpose.

The general character of the country in the vicinity of the river from Spokane to Chelan may be described in a few words. The river flows through a deep and rugged cañon with very little bottom land along its banks. It can be approached from the Great Plain on the south only in three places: by the Virginia Bill road, Whitestone road, and Foster Creek. From the north it can be approached in more places, and generally wherever a stream comes in a good easy way exists of getting to the river. The country to the north has been very much more eroded than that to the south.

Soon after leaving the Big Bend the timber begins to disappear from the river, and soon can only be seen in scattering trees in the ravines, and in large quantity only when a vista allows a sight of the distant northern hills.

When the Colville Indian Reservation is thrown open to settlement, and becomes populated with thrifty and industrious whites, a railroad will be needed up the Sans Poil Valley. But of course this will not be required for a long time.

CHAPTER IV.

LAKE CHELAN TO SNAKE RIVER.

October 6.—We left Chelan at 7:30, after saying good-bye to our Indian friends, and with a good swift current went gliding rapidily along. In about one mile we passed the mouth of Chelan Creek, a roaring little stream. Passing through an occasional ripple, we came soon to some quite strong rapids, caused by a collection of rocks near the left bank. These I have called "*Downing's Rapids*," from my assistant, Mr. Alfred Downing, who, during the previous year while encamped at the Chelan Crossing, got adrift in a small boat and went through this portion of the river at night, and was wrecked in Rock Island Rapids, and barely escaped with his life.

At seven miles from Chelan Creek we came to a rapid, where the water flows over a bowlder and gravelly bar, on which there was a depth of from seven to eight feet. The current sets very strongly from the left to the right bank. We pass three small streams coming in from the west, and begin to meet with some of the beautiful rock scenery with which we are soon to be charmed. The right bank of the river is a steep, rocky bluff, about 2,000 feet in height, and is striped with strata of different-colored rocks, principally white, gray, nearly black, and dark brown. It is all volcanic rock, and the *Ribbon Bluff* presents a very handsome appearance. Five or six miles further down we come to the Enti-at-qua River, a fine stream, coming in from the west. There is quite an Indian village on its banks, and several of the Indians were engaged in spearing salmon from canoes, paddled and poled along the the shallows by assistants. Just below the mouth of the Enti-at-qua River there are a number of bar islands, and the river is very shallow. We apparently went in the main channel, and I found only three feet of water over the bar. It is barely possible that a deeper channel exists, but I do not think so. The river is spread out and the bar is evidently formed by the material brought down by the Enti-at-qua, when, in the spring or summer, it becomes transformed into a raging torrent. As it was considerably above low water when we came down, it would appear that this bar may cause considerable trouble during the very low stages of water, and boats should be made as light in draught as possible to pass over it. This is the shallowest water met with yet. At the lower end of the bar is quite a strong little rapid.

Five miles further down there is a commanding point on the left bank, from which a view can be obtained for a long distance up and down the river, and has for many years been used by the Indians as a lookout station. I called it Longview Point. A short distance of about a mile below Longview Point there is a large number of rocky points, rising from the water near the right bank, causing swift, turbulent water, which will probably get much worse as the water rises. The river is now excellent as far down as the Wenatchee River, which we reach at 1:30. This river, for the lower part of its course, flows through a level plain of fine agricultural land, containing from twenty to thirty square miles. To the west rise the foot-hills of the Wenatchee Mountains, and we get a view now and then of the snowy summits.

Across the Columbia the bluffs, which have lined the river bank pretty closely since Chelan was left, here break back considerably into more rounded hills, and it is possible that skillful engineering may, in time, bring a railroad down to the river at this point, if it ever becomes necessary or desirable. This has always been a favorite crossing-place with the Indians, and their trails lead from here in every direction.

There is one settler at the mouth of the Wenatchee, a man named Miller, who has a store and a ranch, with a very promising orchard. The Columbia here widens considerably, and the Wenatchee has deposited in it an enormous amount of *débris*, forming at the present stage a number of flat bar islands, and causing a very decided shallowing of the river, there being not more than three or four feet of water in what appeared to be the main channel. Any steamboat-landing for Wenatchee River had better be below the mouth about a mile or more. At the lower end of these flats there is a strong rapid. Mr. Miller informed me that there was a pretty good wagon-road, which had been built during the occupancy of Chelan as a military post, from the Kittitas Valley to the mouth of the Wenatchee. It goes down the Columbia for five or six miles and then breaks to the west.

After leaving the Wenatchee for a few miles the river was very good, but we soon began to encounter rapids and rocks in great abundance. Looking down, we see almost a continuous wall across the river, formed by the uplifted island points, and around us bubbles and whirls the water over the sunken rocks, whose heads lie just below the surface. The rocks are projecting points of black basaltic rock, and this is certainly a part of the river requiring skillful navigation. The rock-bound shores are steep and rugged. On we glide, winding in and out among the rocks, guided by the experienced hand of old Pierre, and soon we begin to hear a more decided roar and rumble on ahead, and to realize that we are fast nearing the dreaded Rock Island Rapids. Soon the boat is steered to the shore, and old Pierre gets out, and, with his Indians, goes on ahead to take a look at the state of things below and determine on his course through the rocks, and explain to the Indians what they must do. Finally, after an animated discussion among them, it is decided, and all return to the boat and prepare for the passage, as at the Nespilem Rapids, by removing gloves and all superfluous clothing and tying red handkerchiefs tightly about their heads. Choosing the right-hand channel, our boat hugs the right bank pretty closely, passing safely the upper ripple, and apparently going straight for some jagged, rocky points jutting out from the shore below. Before she reaches them, however, she is caught in an eddy, and it is only by the most supreme exertion that our oarsmen can get her out. Finally she is free, and away she goes like a bird, shooting through between the jutting points and the large island into the main rapid, where she is almost engulfed in the tumbling, roaring waters; on she goes into the river below, and then makes for the shore, and we go into camp for the night on the right bank, just below the rapids.

Much better idea can be obtained of these rapids by the map of them which accompanies this report than can be formed by any description. There are two channels, the east and west. We used the west, and at this stage of water I have every reason to believe that a good, powerful steamer, properly handled, could go up it.

Old Pierre says that in extreme low-water this channel becomes nearly dry, and in this condition is unnavigable. This west channel is considerably wider than the east one, and is quite straight, except at the lower end, where it is rendered crooked by the jutting bed-rock.

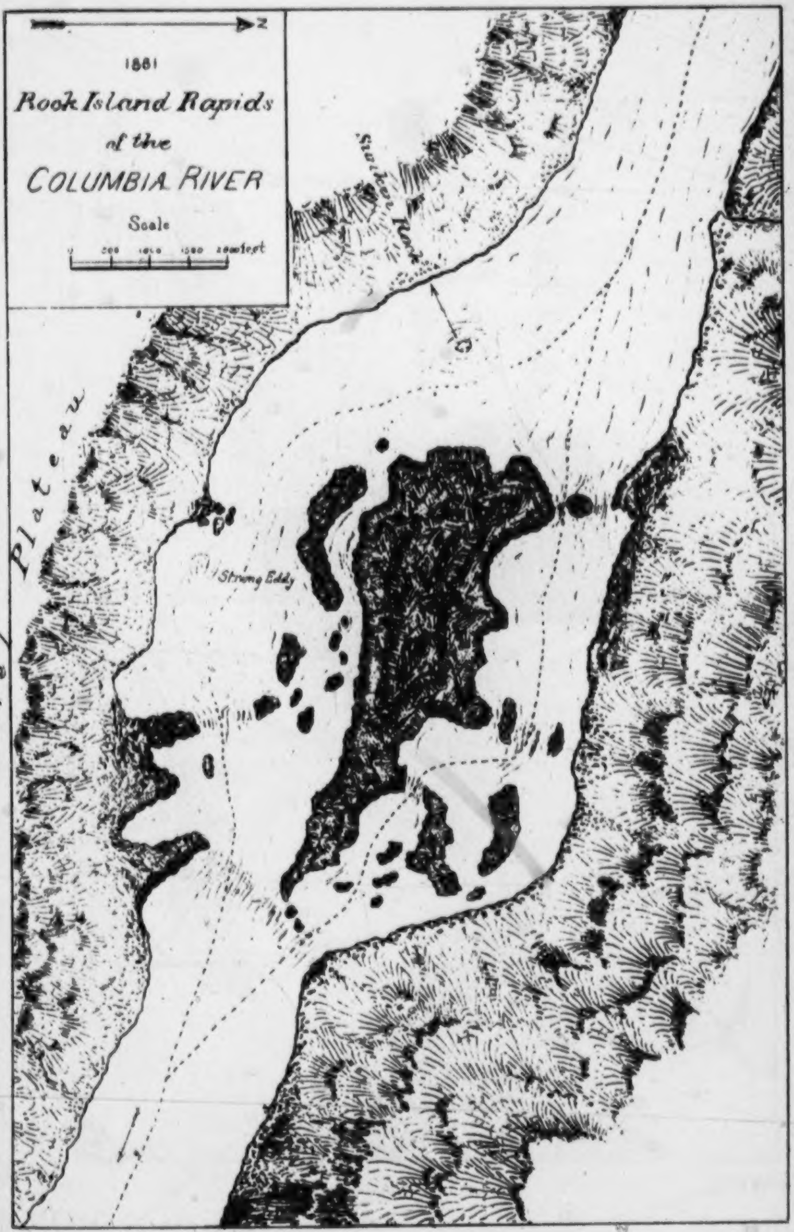
The east channel is the deeper one and is the better one, Pierre says, in low-water, and also in extreme high-water, but in ordinary stages the west one is the better.

The small steamer Chelan was brought down during high-water through the east channel, and she struck two or three times on account of breaking her rudder, but managed to escape. The course is very crooked, and there is quite a fall near the head of the large island which divides the channel. There are several sunken rocks among the rapids.

In regard to the improvement of navigation at these rapids, the proper system to be adopted can only be determined after observations extending over months have been taken. I will hazard the assertion, however, that for all ordinary stages of water the west channel can be made navigable by the removal of rocks and jutting points. In comparison with the Nespilem Rapids, the obstructions caused by these rapids is slight.

All along on the east side of the Columbia the bluffs are precipitous and 2,000 to 2,500 feet in height, being in some places nearly perpendicular and in others slightly broken away. In some places the bluffs recede short distances from the shore to give place to bowlder flats. The west side is still more mountainous, but is broken here and there by a small stream, and through the gaps distant views of wooded and snowy mountains are had. Nothing of this kind breaks the monotony of the eastern shore. There are several Indian farms along the river between Chelan and these rapids, and a number of Chinese miners were passed during the day. An excellent route for a portage exists along the western shore on a terrace about one hundred feet above the water.

After leaving the main rapids we passed through about one mile of river in which were many rocks, and then through a rapid of considerable strength. Then came a quiet stretch of water for three or four miles,


N
1881
Rock Island Rapids
of the
COLUMBIA RIVER
Scale
0
500
1000
1500
2000 feet
Sunken Rock
Strong Eddy
Level Plateau

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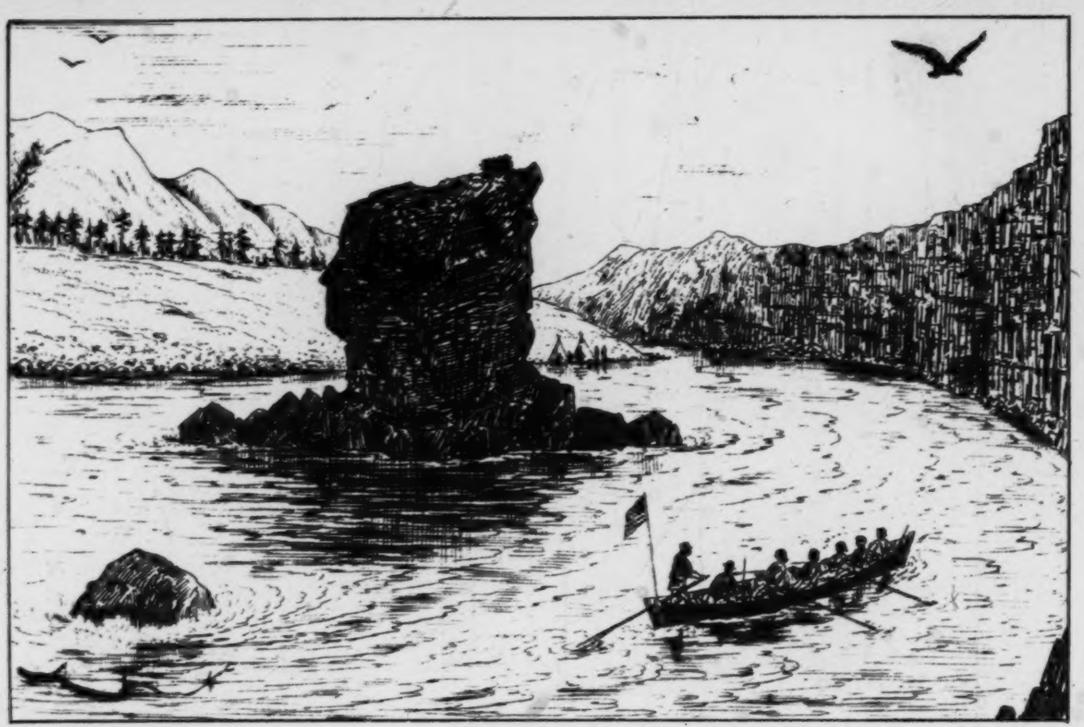

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VICTORIA ROCK

and Cabinet Rapids were reached. These are caused by rocks sticking up near the left bank and jutting out therefrom. The rapids are swift and bad, and if the river is to be navigated must be improved by removing some of the points of rocks and regularizing the slope. Just below these rapids there is a Coulée mouth on the left bank.

A few miles further down there stands in the Columbia River a rock which is one of the most perfect profile rocks in existence. Approaching it from the north, it presents a striking likeness to the profile of Queen Victoria, from which circumstance it was given the name of "Victoria Rock." Coming nearer to it and passing it on the west, the profile changes and merges into a more Grecian and Sphinx-like face, whose placid immobility takes one's mind involuntarily to far-off Egypt. It rises from the surface of the water about one hundred feet, and a pair of eagles have selected it as their home, and upon its extreme top have built a nest, giving, as it were, a crown to this goddess of the Columbia. The rock is of columnar black basalt.

The portion of the river in which this rock is situated is very grand and beautiful. The banks are nearly precipitous bluffs, from 2,000 to 3,000 feet high, composed of columnar black basalt, which takes many wonderful shapes and produces many pleasing effects, rivaling the famous Giant's Causeway of Ireland in weird beauty. The columns are in every conceivable position, sometimes piled up like cordwood, in some places erect, and in others inclined; some great masses are twisted and bent, forming niches, arches, grottos, crowns, &c. In one of these niches, a thousand feet above the river, there lies in an inclined position a stick of timber, barkless and white with age. It never grew there. It is a thousand feet from the top of the vertical bluffs, and could not have been put there from above. The only way in which it could have reached its present position was by being caught there when the river was a thousand feet higher than it is now, drifting in and lodging, and being left there by the receding river.

My pilot, "Old Pierre," an Indian pilot and *voyageur* of the old Hudson Bay Company, said that this log was a landmark in the days when this company transported their furs and merchandise up and down the river in bateaux. He says that the Indians always considered that the log was left there when the river was up at that height. This is one link in the chain of evidence that proves that at no distant date the Columbia was a stream of such magnificent proportions that the present river is a tiny rivulet compared with it. If this be the true explanation of the location of this log, it is a remarkable example of the preservation of wood for a long period of time. It may be that the log is petrified, but I had no means of getting at it to determine.

There are many other things which may be cited in proof that this river has but lately become reduced to its present size. All along up the river, wherever there is a concave portion of the bluffs, there we find terraces of from ten to five hundred feet in elevation above their neighbor terraces below. These are all composed of rather loose soil, bowlders and gravel, and river sediment, and have well defined and sharp edges. These prove incontestibly the former grandeur of the river, and exist to a height of 2,000 feet or more above the present river, and their sharp and well-defined edges would seem to prove their newness in the scale of time.

The picture-writings at the upper end of Lake Chelan were in all probability made when this lake was a great arm of the greater prehistoric Columbia, and both were hundreds of feet above their present level.

A few miles below Victoria Rock we came to the mouth of the two coulées, which are presumably those of Moses Coulée and the coulée breaking in from the south of Badger Mountain, and which is commonly accepted as the continuation of the Grand Coulée.

In three or four miles further we come to Gualquil Rapids, which are about a quarter of a mile in length and form no obstruction, and then we had seven or eight miles of the most perfect river, and we went smoothly gliding along, with no sound but the monotonous rhythm of the oars to break the stillness. The bluffs have been getting lower and lower on both sides of the river, and the strata seem to slope down from the north, indicating an upheaval to the north or a subsidence to the south.

The terrace formation so prevalent further north, here has almost entirely disappeared.

After passing a small stream coming in from the right about two miles, we come to Island Rapids. A bar island obstructs the free flow of the water, and a little rapid is formed which is not at all bad.

About two miles below these rapids the country opens out on the west into a broad flat, with rolling hills to the rear, while the bluffs on the left bank keep getting lower and lower. Down over a good river we move along, and soon come to the Crab Creek Coulée, running along the northern side of Saddle Mountain. Crab Creek discharges no water into the Columbia—at this season of the year, at any rate.

Just below Crab Creek Coulée the high steep bluffs come down close to the river on both sides. On the left bank the bluff is the end of Saddle Mountain, on the right bank it is the commencement of a ridge extending off to the west.

To the south of these *Sentinel Bluffs* the country becomes flat, sandy, and uninteresting, elevated but a little above the river.

Saddle Mountain is a range of grass-covered hills, extending nearly due east, and terminating in the desert plains a few miles to the northeast of White Bluffs. Between it and the curve of the Columbia which swings around by Priest Rapids and White Bluffs the country is largely composed of sandy, gravelly, worthless soil. Some grass exists and some large areas of sage-brush, but what soil there is seems to be more alkaline and powdery than in other sections of the Columbia basin.

On the right bank, below the Sentinel Bluffs, the cliffs recede and a plateau lies along the river, which seems to be of poor quality and not well fitted for any purpose of agriculture. The hills back from the river appear more fertile, being covered with grass and appearing to have springs scattered along their brown sides.

For about five or six miles the river in this portion of its course is very sluggish, wide, and deep, and on the beautiful day during which we passed over it, it seemed to be more like a lake than a river. This dead water is evidently caused by the damming up by the obstructions below at Priest Rapids. The *first ripple* of the system of Priest Rapids is a slight one as far as the swiftness is concerned; the water, however, is shallow, flowing over immense bowlders and jagged rocks, which were plainly visible from the boat and at a variety of depths below the surface. Near the left bank many of these rocks come above the water, and the whirls told plainly that many others were just below the surface. Our course lay about the middle of the stream, and the sounding-pole would indicate one instant perhaps a depth of three or four feet, the next ten or twelve, and the next five or six. Through this portion of the river a steamer could go now in safety after finding and knowing thoroughly a good channel.

The *second rapid* is about as bad a place as there is on the whole river. All about, the bed-rock points and islands rise up in ugly, black, jagged masses, threatening destruction to anything that touches them. The bottom, as in the first ripple, is composed of huge bowlders and rocks, and the water flows swiftly over this dangerous bottom and these outcropping rocks with a depth of only three to four feet. The fall here is considerable; we passed over one fall of at least three feet.

A steamer could not ascend this rapid without the use of a line, and even then the greatest care would be necessary. A smooth stretch of quiet water then followed, and we came to the *third rapid*, which was swift and shallow, with considerable bed-rock jutting up near both shores. The bed of the river at this rapid is the same as it has been all along, composed of large bowlders.

For about five and a half miles now the river is quiet and slow, with rocks scattered about here and there, generally in clusters. The water is so shallow that we are able to see bottom for a great part of the way, and is from twelve to twenty feet in depth. The *fourth rapid* is in this stretch of water, but is very mild in character and presents no obstruction.

We now come to a very bad portion of the river, consisting of the three lower rapids of Priest Rapids. We are able to tell from the preparations made by old Pierre and his crew that something bad is coming, as well as by the roar that reaches our ears, and the black, rugged rocks that seem to extend nearly the entire way across the river.

We reach a point where a black-rock island lies toward the left bank, and a long, irregular mass stretches along near the right bank. This lies along the *fifth rapid*, in which the water is very turbulent, boiling and roaring a great deal. This boiling and foaming is not, however, necessarily attended with great swiftness of current, for in this ripple we did not move as fast as in some others which appeared much more quiet. In fact, the tumbling over the uneven bottom which causes the agitation tends to check the velocity considerably.

The long, irregular mass near the right bank which lies along the fifth rapid continues on down the river for about two and a half miles, with only an occasional break.

A little below the fifth rapid we come to where the main channel is divided into two by another long, irregular, jagged mass of the same black basaltic rock, thrown along almost in the center of the river. We choose the right-hand channel of the two, and, after swiftly passing a few ugly-looking projecting points, we find ourselves in the *sixth rapid*, shooting with the speed of a race-horse down through the canal-like channel between these two long rock islands. For about a mile we tore along with the united speed of the raging torrent and our yelling Indian oarsmen. This channel seemed to have plenty of water, but is quite narrow, being about sixty to eighty feet wide. We went through it at the rate of about twenty miles an hour.

The left-hand channel is the one better suited to purposes of navigation, I believe. I did not examine it, but it has been examined by Captain Gore, of the Oregon Railway and Navigation Company, who informed me that he took a steamer up through it and brought it back. The little steamer Chelan was taken down through this channel in safety.

This left-hand channel is crookeder and the water is not so swift as in the straight-away one through which we came.

Emerging from the canal-like sixth rapid, old Pierre throws the boat to the left to avoid some bad-looking water dead ahead, and, after a little further tumbling and rolling about in the *seventh rapid*, we emerge with a shout of joy from the eleven miles of Priest Rapids. We all know now that our dangers are passed, and thank God for allowing us to safely come through all the rapids.

We soon make for shore, and camp on the right bank, having made during the day about fifty-eight miles.

At this point on the Columbia, at the lower end of Priest Rapids, must surely be located a town of considerable importance, as it will for a long time be the head of navigation on the river. It is the most convenient place from which to reach the Yakima and Kittitas valleys, which now communicate with the lower country by a wagon-road over the Simcoe Mountains to the Dalles. The rapids will furnish a splendid water-power, and in all probability here will be located flour and saw mills, as well as warehouses and stores. Logs can be brought down the Columbia to be here sawed into lumber and distributed to the surrounding agricultural regions. The rapids are centrally located for many fine valleys and much promising country, and are easily reached by wagon-roads from many directions.

Along the lower portion of the river traversed this day the rise and fall of the water is much less than along any other portion of the river, judging by the line of drift-wood along the banks and the small elevation of the plains above the river.

On Saturday, October 8, we left our camp below Priest Rapids and pulled down the river. Very few objects of interest were to be seen. The country on each side is low, flat, and the soil appears sandy and unproductive. To the south the flat land extends away to the Yakima River. Our course during the forenoon lay nearly due east, and where the river again makes a great bend to the south we come to the well-known *White Bluffs*. The river makes a semicircular sweep to the north and cuts into the bluffs, leaving a very nearly vertical wall of from one-hundred to six hundred feet in height. The rock is a sandy marl, soft and friable, which easily powders where the cattle have traveled over it in going up and down hill for food and water. We continue along under these bluffs for ten miles or more. There are a great many birds' nests, made of clay, attached to the bluffs, but the birds whose houses they were had all fled.

Numbers of cattle and some horses were seen which graze on the plateaus along the river, to which they come down for water. We passed during the day several camps of Indians engaged in salmon-fishing; in one camp were nineteen lodges. A little after eleven o'clock we passed the old military depot camp at White Bluffs, where the storehouses still stand.

During the day we made about fifty-seven miles. The river is all the way an almost perfect river for steamboating, the drawback being the bars and shifting channel along by White Bluffs; but over these bars there seems to be a sufficiency of water for all purposes. We passed a great many bar islands, and encamped about six miles above the mouth of the Yakima.

The next day, Sunday, October 9, we left camp bright and early, and by ten o'clock reached the mouth of Snake River. The country along the river, with the exception of a small area near the mouth of the Yakima, is very poor; in fact, must be considered a desert. Back from the river, especially to the east, the soil is good, though light, and the only drawback to its successful cultivation is the lack of rains in the summer and the facility with which it becomes dry and powdery.

At a distance of nine miles above the mouth of the Snake River the Yakima comes into the Columbia from the west. It rises in several large and beautiful lakes in the Cascade Mountains, in about latitude 47° 30′, and, taking a general course to the southeast, runs for one hundred and sixty miles to its confluence with the Columbia. For twenty-five miles down the stream its valley is only from half a mile to a mile wide; it then widens out into Kittitas Valley, which is ten to fifteen miles wide, the river there being ninety feet wide and about three feet deep, and very rapid.

Below this valley the river curves gradually to the south until it receives the waters of the Pisko, then it turns again to the eastward, in which course it continues to its mouth. Between the Kittitas and Atahnam the hills again encroach on the valley, but below that it widens out again to from six to ten miles, with numerous branchings among the hills. On the west side, opposite Kittitas plain, these small streams rise among the hills separating the main Yakima from its principal branch, the Nachess. These streams are from fifteen to twenty miles long and run through small and fertile valleys. The Nachess rises in the vicinity of the Nachess Pass, and running nearly parallel with the Yakima at a distance of fifteen or twenty miles, joins it after flowing about fifty miles. It has a valley from half a mile to four miles in width. The Atahnam rises about thirty miles south of it and runs in a more easterly course, emptying into the Yakima about ten miles below; its valley is smaller than that of the Nachess, but fertile. The Pisko resembles the Atahnam. The Yakima is not navigable for boats of any kind.

About its headwaters there is much good timber, and it furnishes a natural waterway to get it out to the Columbia. This is, however, attended with great difficulty, owing to the fact that the river in the lower parts of its course spreads out and becomes very shallow. It is only when at its very highest that there is sufficient water to float logs, and this high water only lasts a few days. If advantage is taken of it, logs can be brought down; if not, they will lodge and remain fast on the river bars. This has proved a great source of delay, loss, and inconvenience to those engaged in getting out timber for the Northern Pacific Railroad.

The town of Ainsworth is situated on the right bank of the Snake River, about a half-mile above its mouth.

It is at this point that the Northern Pacific Railroad crosses the Snake, and here are the company offices of the railroad division, built in the midst of a bleak, dreary waste, in which for many miles around sage-brush and sand predominate. Ainsworth is one of the most uncomfortable, abominable places in America to live in. You scan the horizon in vain for a tree or anything resembling one. The heat through the summer is excessive, and high winds prevail and blow the sands about and into everything. By the glare of the sun and the flying sands one's eyes are in a continual state of winking, blinking, and torment, if nothing more serious results. Captains Lewis and Clarke found the Indians of this country very much afflicted with sore eyes, which they ascribe to the glare of the sun on the desert and rivers and the prevailing sand-bearing winds. It is interesting to know that they took advantage of the fact and procured plenty of horses and provisions from the Indians in exchange for the surgical operations which they performed and the medicines which they gave the Indians, especially the much-desired and needed eye-water, from which their patients found great relief. Their journal says:

> We were by no means dissatisfied at this new resource for obtaining subsistence, as the Indians would give us no provisions without merchandise, and our stock was now very much reduced. We cautiously abstained from giving any but harmless medicines, and as we could not possibly do harm, our prescriptions, though unsanctioned by the faculty, might be useful, and were therefore entitled to some remuneration.

It was only by utilizing this source of revenue, after their stock in trade was exhausted, that the distinguished explorers were enabled to make their way back to the regions of civilization.

The railroad terminus across the river from Ainsworth was named, and for some time bore, the appropriate name of *Hades*, but some of the higher authorities condemned the name, and substituted therefor South Ainsworth.

We drew our boat upon the bank, put the oars in her, and abandoned her. The Indians were very much interested in everything about the place, and I explained things to them as well as I could. I paid them off, gave them tickets back to Colville, and each a letter of recommendation, and Mr. Downing and I gave them all our extra clothing, and they seemed supremely happy. Old Pierre made sundry visits to a whisky saloon, but promised not to get drunk until he returned to Colville where he said he would have two good drunks and then stop. The other Indians did not seem to have any inclination to drink. I cannot praise them too highly for their skill, their uniform good-nature, honesty, endurance, and sobriety. I think it would be very difficult to pick up at a few hours' notice four white men who would row a heavy boat through dangerous rapids for four hundred miles without wanting strong drink, or be able to withstand, after being paid off, the temptations of drinking-saloons.

Thus our journey down the river ended. We left the Indians to pursue next day their way back to Colville, and that night Mr. Downing and I took the cars and safely arrived at Vancouver the next day.

CHAPTER V.

TABLE OF DISTANCES ON THE COLUMBIA RIVER.

In computing the following table of distances I have made use of the distance tables of the Oregon Railway and Navigation Company in determining the distances from the mouth of the Columbia to Snake River; from this point the distances are those determined on my recent survey of the river and platted on the accompanying maps.

I have only given the important points up as far as Snake River.

The first column of figures gives the distances between the consecutive points named; the second column gives the total distance of the point named from the mouth of the Columbia River; the third column gives the total distance of the point named from the Boundary line; and the fourth column of figures gives the total distance of the point named from the mouth of the Snake River, both down and up the Columbia.

It will be seen by comparing my distances with those of Captain Pingstone, whose report on the river is partially given herewith, that they do not agree, his distances being generally much greater than those given in my table. The distances here given were taken with the greatest care from point to point, and the whole was platted and fitted very closely between the known positions of the boundary and the mouth of the Snake:

	Distance apart.	Distance from mouth of Columbia River.	Distance from Boundary line.	Distance from mouth of Snake River.	Remarks.
Mouth COLUMBIA RIVER	......	....	752	336	
ASTORIA	10	10	742	326	
Kalama	68	78	674	258	
Mouth Willamette	30	106	644	228	
Vancouver	8	114	638	222	
Lower Cascades	45	159	593	177	
Upper Cascades	6	165	587	171	
Hood River	18	183	569	153	
THE DALLES (city)	23	206	546	130	
Celilo, at head of Dalles	14	220	532	116	
UMATILLA	82	302	450	34	
Wallula	23	325	427	11	
SNAKE RIVER (AINSWORTH)	11	336	416	0	Northern Pacific Railroad crossing.
Mouth Yakima River	9	345	407	9	
Foot of Long Island	23	368	384	32	
Head of Long Island	4	372	380	36	
Old White Bluffs Depot	10	382	370	46	Road from here to old Camp Chelan and to Spokane Falls.
End of White Bluffs	5	387	365	51	
Ferry across Columbia	22	409	343	73	Road from here to Kittitas Valley and to Yakima.
PRIEST RAPIDS:					
Seventh Rapid	.5	409.5	342.5	73.5	
Head Sixth Rapid	1.5	411	341	75	
Fifth Rapid	1	412	340	76	
Fourth Rapid	4	416	336	80	
Third Rapid	1	417	335	81	
Second Rapid	2.5	419.5	332.5	83.5	
First Rapid	1.5	421	331	85	
Sentinel Bluffs	4.5	425.5	326.5	89.5	
Mouth Crab Creek Coulée	1	426.5	325.5	90.5	
Bar Island, upper	6.5	433	319	97	
Island Rapids	4	437	315	101	
Gualquil Rapids	10	447	305	111	Called also Eagle Rapids.
Lodgestick Bluff	4.5	451.5	300.5	115.5	

	Distance apart.	Distance from mouth of Columbia River.	Distance from Boundary line.	Distance from mouth of Snake River.	Remarks.
Mouth Grand Coulée	4	455.5	296.5	119.5	
Mouth Moses Coulée	1	456.5	295.5	120.5	
Victoria Rock	5	461.5	290.5	125.5	
Cabinet Rapids	2	463.5	288.5	127.5	
Rapid	3	466.5	285.5	130.5	
Rock Island Rapids	......	......	......	......	Called also "Osé de Pierre Rapids," Isle de Pierre Rapids and Buckland's Rapids.
Foot	1	467.5	284.5	131.5	
Head	1.5	469	283	133	
Bishop's Rock	6.5	475.5	276.5	139.5	
Com. of Rock Islands and Rapids	1	476.5	275.5	140.5	
Road to Kittitas leaves river	1.5	478	274	142	
Rapid below Wenatchee flats	4.5	482.5	269.5	146.5	
Wenatchee River	2	484.5	267.5	148.5	Bad bar and gravel flats just below mouth, Miller's Store and Ranch.
Rocky Bar	6	490.5	261.5	154.5	
Longview Point	2	492.5	259.5	156.5	
Rapid below Enti-at-qua Bar	5.5	498	254	162	
Enti-at-qua River	2	500	252	164	
Ribbon Bluff	7.5	507.5	244.5	171.5	
Bar and Rapid	8	515.5	236.5	179.5	
Rapid	2	517.5	234.5	181.5	
Downing's Rapid	4	521.5	230.5	185.5	
Chelan River	1.5	523	229	187	
Chelan Crossing, Indian village	1	524	228	188	Old crossing for Camp Chelan, Indian Ferry.
Rapid	4.5	528.5	223.5	192.5	
Rapid	7.5	536	216	200	
Lower end Methow Rapids	3.5	539.5	212.5	203.5	Called also Ross Rapids.
Methow River	1.5	541	211	205	
Bar	6	547	205	211	
Okinakane River	2	549	203	213	
Foster Creek	9	558	194	222	
Foster Creek Rapids	1	559	193	223	
Rapids	2	561	191	225	
Rapid	3	564	188	228	
End Short Rapids	2	566	186	230	
Commencement Short Rapids	1.5	567.5	184.5	231.5	Rapids 1½ miles long.
End of Long Rapids	2	569.5	182.5	233.5	Rapids 4 miles long.
Kalichen Falls and Whirlpool Rapids	1	570.5	181.5	234.5	
Commencement Long Rapids	1	571.5	180.5	235.5	
Rapid	1	572.5	179.5	236.5	
Rapid	3.5	576	176	240	
Rapid	1	577	175	241	
Rapid	1	578	174	242	
Rapid	2.5	580.5	171.5	244.5	
Mah-kin Rapids	1.5	582	170	246	Called also Cannon Rapids.

	Distance apart.	Distance from mouth of Columbia River.	Distance from Boundary line.	Distance from mouth of Snake River.	Remarks.
Nespilem River	8	590	162	254	
Equilibrium Rapids	3	593	159	257	
Monaghan's Rapids	2.5	595.5	156.5	259.5	
Strong Rapid	4.5	600	152	264	
Rapid	3	603	149	267	
Grand Coulée	2	605	147	269	
Ne-ah-kwa Creek	7	612	140	276	
Mammoth Spring	7	619	133	283	
Sans Poil River	2.5	621.5	130.5	285.5	
HELL GATE	4	625.5	126.5	289.5	
Friedlander's Store	2	627.5	124.5	291.5	Road to the South.
Whitestone and Whitestone Creek	2	629.5	122.5	293.5	
Castle Cove	5	634.5	117.5	298.5	
Welsh Creek	4.5	639	113	303	
Hawk Creek; "Virginia Bill's"	1.5	640.5	111.5	304.5	Excellent road to the south.
China Camp on Island	2.5	643	109	307	
SPOKANE RIVER	2.5	645.5	106.5	309.5	
SPOKANE RAPIDS	0.5	646	106	310	
Mitre Rock	4	650	102	314	
Camp Creek	4	654	98	318	
Deer Creek	1	655	97	319	
Rapid	1	656	96	320	
Ik-ke-lux-tum Creek	3	659	93	323	
Elbow Bend, Black Island Rapids	2	661	91	325	
Rapid	2	663	89	327	
Rogers Bar	2.5	665.5	86.5	329.5	
Rapid	1	666.5	85.5	330.5	
Ne-al-me-chin Creek	2	668.5	83.5	332.5	
Rapids, big jutting rock (left bank)	3.5	672	80	336	
Turtle Rapids	3	675	77	339	
En-el-cost-em Creek	7	682	70	346	
En-cha-lay-em Creek	1	683	69	347	
Rock Island and Bar near (right b'k)	1.5	684.5	67.5	348.5	
Charley Francais Bar	2	686.5	65.5	350.5	
Sans Poil Indian Settlement and Bar	2	688.5	63.5	352.5	
En-qua-shay-em Creek	3	691.5	60.5	355.5	
Tch-ka-ka-wick's house	4.5	696	56	360	
Driftwood Rock Island	2.5	698.5	53.5	362.5	Rapid.
RICKEY'S LANDING	3	701.5	50.5	365.5	
GRAND RAPIDS	2.5	704	48	368	
Mouth Colville River	3	707	45	371	
KETTLE FALLS	4	711	41	375	
Kettle River	2	713	39	377	
Old Fort Colville	1	714	38	378	
Six-Mile Bar	6	720	32	384	
Twelve-Mile Bar	6	726	26	390	
Little Dalles	11	737	15	401	
BOUNDARY LINE	15	752	0	416	

To this I add the following distances derived from the works of Alexander Ross and others:

	Distance apart.	Distance from mouth of Columbia River.	Distance from boundary line.	Distance from Snake River.	Remarks.
BOUNDARY LINE	....	752	....	416	
Pend d'Oreille River	1	753	1	417	
Kootenay River	24	777	25	441	
Lower Arrow Lake	12	789	37	453	South end.
Do	42	831	79	495	North end.
Upper Arrow Lake	16	847	95	511	South end.
Do	33	880	128	544	North end.
Little Narrows or Dalles	37	917	165	581	
City of Rocks	22	939	187	603	
Dalles des Morts	23	962	210	626	
Boat Encampment	70	1,032	280	696	Canoe River and Portage River.

CHAPTER VI.

NAVIGATION OF THE COLUMBIA RIVER.

From its mouth to the mouth of the Willamette, the Columbia is navigated by ocean steamers, sea-going ships, and river craft of all kinds.

From the Willamette up to the Cascades, river boats find abundant water and go freely at all seasons of the year except when the river freezes up, which happens generally each winter. The freeze-ups on this portion of the river last but a short time, however.

At the Cascades the obstruction to navigation is complete. Boats cannot ascend the rapids at all, and they cannot descend with any degree of safety. Here, in order to render the river navigable, means must be adopted to pass boats both up and down over the rapids. A canal with locks has been adopted as the means to do this, and work has progressed on it for several years. When this is completed navigation will be continuous up to the Dalles. This will throw the river open to all who wish to navigate it, and a healthy competition will be the result for all the trade centering on the river at and below the Dalles.

The Dalles is another complete and total obstruction to navigation. Boats can neither go up nor down them, and in consequence means must also be adopted here to pass them both up and down, if complete river navigation is proposed. Surveys have been made and plans and estimates are now being prepared for the desired improvement here.

With these two serious obstacles removed, there would be continuous navigation to Priest Rapids, a distance of 409 miles from the sea, and by the Snake River to the Grande Ronde River, 30 miles above Lewiston, a distance of 516 miles from the sea, making a total of navigable water of 589 miles. To this must be added the navigable waters of the Clearwater, the extent of which I do not know.

This would throw open to competition the river transportation demanded by the great grain belt between the Cascades and the Bitter Root Mountains, south of the forty-seventh parallel.

By no other means could the government confer a more decided and lasting benefit upon the people of this great section than by removing the obstructions to navigation at the Cascades and Dalles.

The portions of the river at present regularly navigated by river steamers are those below the Cascades to the mouth of the river; between the Cascades and the Dalles; and from Celilo, above the Dalles, to the mouth of the Snake River, on the Columbia; and up the Snake to Lewiston. Once in a while a steamer makes a trip to Priest Rapids, but the business is not sufficient at present to cause one to be sent with any regularity. The Columbia, from the mouth of the Snake to Priest Rapids, is excellent for the purpose of navigation and will never need any improvement, in all probability.

If Priest Rapids could be improved it would give navigation thence to Cabinet Rapids, a few miles below Rock Island Rapids. The consequence of throwing this portion of the river into the prospective continuously navigable river below will be readily seen by a study of the map. The splendid valley of the Kittitas and Upper Yakima would have an easy and short outlet to the navigable river. I have never been in this portion of the country, but am assured by those who have that a great amount of fine land exists there.

On the other side of the river the fine country composing Badger Mountain would be benefited, and would be settled and its produce taken to tidewater by the river boats.

The amount of country to the west of the river which would be benefited by the improvement of Priest Rapids is about thirteen hundred square miles, of which a large portion is arable and grazing land of excellent quality. On the east of the river there is an area of about four hundred square miles, a great part of which is the finest quality of agricultural land. This of course is the area to be directly benefited; indirectly, all the country up the river would be benefited, as well as all the portions below which will need lumber and fuel, readily obtainable in the region of the Upper Yakima and Wenatchee.

CABINET AND ROCK ISLAND RAPIDS.

A distance of about forty-two miles of navigable water lies between the head of Priest Rapids and the foot of Cabinet Rapids. This portion of the river, if it ever becomes well known, will be celebrated for its beauty and grandeur. Out of the same materials as those which compose the "Giants' Causeway" of Ireland, nature has formed and decorated this locality.

In any scheme for the improvement of the navigation of the river

Cabinet Rapids and Rock Island Rapids must be considered together, as they lie only about four miles apart.

Above Rock Island Rapids there is a stretch of ninety miles of navigable water to Foster Creek Rapids, ten miles above the Okinakane. In this section of the river there are some portions where rocks are plenty and waters swift and strong; they can, however, be avoided and overcome by a moderate amount of care, a sufficiency of power, and skillful navigation.

There are four bars in this portion of the river, of which one, about two miles below the Okinakane, and another about eight miles below Chelan, have undoubtedly a sufficiency of water for all purposes. The Wenatchee and Enti-at-qua bars are worse, and it will be well to determine accurately the depth of water on them at the lowest navigable stage, and build steamers to correspond thereto.

My observation did not extend over the entire water-course at either place, and I cannot tell positively the general depth that could be taken over. I believe, however, that, on the Enti-at-qua bar especially, a steamer drawing more than three feet would have serious difficulty in getting over at low-water.

If it is deemed desirable to have steamers on the river drawing more water than there is on these bars it will be easy and inexpensive to dredge out a channel of sufficient depth, and it might be that a simple improvement in the form of a wing-dam would cause the river itself to keep a channel of sufficient depth cut through. At all ordinary stages, however, there would be plenty of water for the class of boats likely to run on the river for many years to come.

We can therefore safely conclude that with Priest Rapids and Cabinet and Rock Island Rapids rendered navigable, the Columbia would be passable for river steamers to Foster Creek Rapids, a distance from its mouth of 559 miles. Let us consider what country would be benefited thereby.

First would be the Wenatchee country, which is splendid in quality and of considerable extent. The fine flat of about twenty-five square miles near the mouth is all that I can speak of with certainty, but undoubtedly up the river are other valleys suitable for agriculture, and a great amount of fine grazing land. The timber in the Wenatchee Mountains and in the whole region of timbered mountains west of the Columbia River will be valuable, and the whole interior country will be benefited by any plan which will assist in giving it easy and cheap transportation to those sections where it is needed.

Second. About the mouth of the Enti-at-qua the amount of arable land is not great; as to what may be in the interior, I am unable to tell.

Third. About Lake Chelan there is a great deal of good agricultural land in the form of open prairies, bunch-grass-covered hills, and rich, rolling timbered country. The lake will furnish the means of getting at a large amount of valuable timber which exists along its banks.

Fourth. About the upper branches of the Methow there is a considerable extent of good agricultural and grazing land. The lower portion of the Methow flows through a range of wooded hills and is hemmed in closely by them; further up, these hills become more rolling and grassy, and the banks of the streams are bordered by level and wide terraces of excellent soil. Throughout this large territory of 4,675 square miles, now set apart for Chief Moses and his people, there are many fine valleys and agricultural hills which would be benefited by an open river.

Fifth. The magnificent country bordering upon and tributary to the Okinakane would be immensely benefited by an open, through river navigation. I have already described, as far as I could, the country in the vicinity of the Okinakane, and will not do so again here.

Sixth. All that portion of the Great Plain of the Columbia lying between the river and the Grand Coulée and Badger Mountains would be benefited by the improvement. This region is at present unsettled and far away from market, but it is a fine agricultural section and will have a large population some day.

The amount of country which would receive a direct benefit from the improvement of Rock Island and Cabinet Rapids, assuming, of course, the removal of all obstructions, and a free and open river below, would be about as follows, the areas given being, as near as possible, the agricultural and choice grazing lands:

	Square miles.
Vicinity of Wenatchee and Enti-at-qua	120
Vicinity of Lake Chelan	100
Vicinity of Methow	500
Vicinity of Okinakane	1,120
Great Plain, west of Grand and Moses Coulées	980
Total	2,820

The indirect benefits to the whole country east of the mountains would be very great, as it would insure the easy and cheap transportation to the grain belts about Walla-Walla and the Lower Snake and Columbia of the wood and lumber abounding about Lake Chelan, the Wenatchee, Methow, Okinakane, and other streams. This commerce in lumber will certainly be of great importance. Besides the commercial interests involved in the raising and shipment of grain, cattle, wool, lumber, &c., other interests of great importance are apt to be created as the country is examined, if mines of the precious metals, iron, coal, &c., are discovered and developed.

I come next to consider the benefits which would arise if the river from Foster Creek Rapids to the Mahkin Rapids was improved so as to allow boats to pass freely from the good river below to the good river above and *vice versa.* In order to consider this properly it is necessary to go ahead a little and take a look at Hell Gate and the Spokane Rapids, the only other obstructions worthy of mention below Grand Rapids near the mouth of the Colville River.

Until proved to the contrary I shall consider that Hell Gate is navigable both up and down for steamers. If it is proved to be too swift for boats to ascend, then some method must be adopted for its improvement which can be considered further on.

Acknowledging that Hell Gate is navigable, we come to the Spokane Rapids, which are not navigable, except by a steamer using a line. They are short and the waters have a considerable fall; but as I have previously said, they can be rendered passable at a small expense by removing the bowlders and rocks which clog the channel and are the cause of the rapids. An expenditure of $20,000 would, I believe, effectually improve this bad place and render it easily navigable at all stages of water. In the mean time, until their improvement shall be completed, any boats engaged in commerce on the river can line over the rapid safely, as the channel has plenty of depth and is straight.

This portion of the river then from Mahkin to Grand Rapids, a distance of one hundred and twenty-two miles, must be considered as navigable, since the only obstructions in it are of such a temporary nature.

If, then, we assume that the river from Foster Creek Rapids to Mahkin Rapids be improved to allow the passage of boats, we see that it will open up the river to Grand Rapids, and all the country tributary to the river up to this point will be directly benefited by the improvement. About a good deal of this country very little is known, but judging from what I do know and have been told, and from the general appearance of the country as seen from a distance, I think that a fair estimate of the good productive land (arable and grazing) which by means of the river improvement would be brought into direct river communication with tide-water is as follows:—

	Square miles.
Vicinity of Nespilem River	360
Vicinity of Sans Poil River	540
Immediate vicinity of Columbia River	1,020
Vicinity of Colville River	600
Vicinity of Spokane River	200
Great Plain south of Spokane and Columbia	2,400
Total	5,120

It is scarcely worth while for me to enlarge on the general benefit to the whole North Columbian Basin, which would be conferred by removing all the obstructions and giving through river navigation from Grand Rapids to the sea.

The continued, earnest, and united efforts of other countries and sections to obtain water transportation to the seaboard by means of rivers and canals, sufficiently attest the estimation in which it is held by the people, and its value and importance are clearly shown by all the navigable rivers and internal water routes of the world.

The Government of the United States has commenced the improvement of the Columbia at the first obstruction, the Cascades; it has taken the preliminary steps toward the improvement at the Dalles, and it will ere long be called upon to commence the improvement at Priest Rapids and the upper rapids to give a continuously navigable river.

If we take a glance forward to the time when all this eastern portion of Washington Territory shall be settled, when the whole land shall be a waving field of grain, with here and there a village or a city; with railroads traversing the country in every direction, and a vast commerce being carried on between the sea and the interior; if we picture to ourselves all this with the Columbia in its present state of interrupted navigability, and then picture it with the river completely navigable from the Grand Rapids to its mouth, we shall be able in some degree to appreciate the importance of undertaking and completing the great works of improvement needed on the river.

In considering the amelioration of the river from Grand Rapids to its mouth, we can divide the rapids which form obstructions to navigation into two classes: *first*, those which do not admit the passage of steamers either in ascending or descending the river, and cannot be made to admit this passage by any work upon the rapids themselves; and, *second*, those which, while forbidding the passage of steamers in ascending, permit them to descend in safety or can be made to permit the downward passage by work on the rapids themselves.

The Dalles, the Cascades, Grand Rapids, and Kettle Falls belong to the first class; all the other bad rapids belong to the second class.

Priest, Cabinet, Rock Island, and the Nespilem rapids all permit or can readily be made to permit the downward passage of steamers. If, then, we suppose that a loaded steamer engaged in river commerce can start at Grand Rapids and safely descend the river to the Dalles, and by means of improvements here and at the Cascades, to the river's mouth, the problem simplifies itself into adopting some system of improvement to permit this steamer with its load to ascend the river.

Passing up from the Cascades and Dalles, the first obstacle which presents itself is Priest Rapids.

IMPROVEMENT OF PRIEST RAPIDS.

The proper plan for improving these rapids must be determined by further surveys and observations extending over a greater length of time than I could devote to them. The lower system of rapids, consisting of the fifth, sixth, and seventh, are close together, and connected with the upper system of the first, second, third, and fourth rapids by a good quiet stretch of river.

I thought while in the vicinity of the rapids that perhaps this lower system might be improved and rendered sufficiently navigable by working upon the bed-rock and bowlders in the river, blasting and clearing away a properly laid-out channel; further reflection, however, induces me to be cautious about expressing such an opinion. Captain Gora, commanding one of the Oregon Railway and Navigation Company steamers, told me that he went with his steamer up through this system into the good water beyond, and turned around and came back, keeping the channel near the left bank. His trip was made when the water was at a low stage and with an unloaded boat.

If the improvement could be effected by this means the cost would not be great. It may be that the upper system of rapids can be improved by the method of blasting and clearing out the river. Above the rapids there is a long stretch of very quiet, deep water, which will bear lowering and quickening a great deal, sufficiently to enable the river to assume a navigable slope down to the middle good water. If the river from the mouth of Crab Creek Coulée to a point a few miles below the rapids could be regularized, it would undoubtedly be navigable.

If, however, when the proper detailed surveys have been made and experiments conducted, it is found, as I believe it will be, that it is not practicable to improve the bed of the river sufficiently to give good navigation, then some other means must be adopted.

The best means to adopt for this purpose I conceive to be a railway, over which boats can be transported from the foot of the rapids to the head.

I would advocate a railway in preference to a canal and locks, on the ground of expense. The cost of the construction of a railway and its adjuncts would probably be not more than from one-sixth to one-fourth of the cost of a canal about Priest Rapids, and its operating expenses would not be very much greater. About the Nespilem Rapids, from Foster Creek to Mahkin Rapids, the cost of a canal with locks would be so great as to render it entirely out of the question to build it or even to contemplate building it; while the cost of a railway would be a reasonable sum proportionable to the benefits to be derived from it, and would answer every purpose of a canal.

Steamboats can certainly go down Priest Rapids safely if under steam and with sound steering-apparatus. To give entire safety and avoid as far as possible all risks, it might and probably would be found necessary to remove some rocks from the channel. The expense of doing this would be slight.

The conformation of the ground is peculiarly favorable for the construction of a railway. It is, along the left bank, a level plain of solid soil, largely composed of bowlders and gravel, at a slight elevation, probably not more than forty feet above the river. As the river is navigable for boats bound down, the railway would have for its end only the taking of boats up stream, and, in consequence, the construction and operation would be very simple. It probably would not take more than a quarter to a third of the time to build a railway that it would a canal, and once well built the railway could be maintained and kept in order as cheaply as the canal.

While it is very far from my intention to give a detailed plan for a railway for transporting river boats around the rapids of the Columbia River, yet I wish to give a very general outline of such a plan.

Just below the foot of the rapids an inclined track could run down into deep water. A carriage, or car, with its top shaped to receive the bottom of the boat, could be run down on this track into the deep water and the boat received in it.

A stationary engine could take the carriage and boat up the incline to a summit point sufficiently high to give a slight down grade to the deep water at the head of the rapids. At the summit the vertical direction could be changed, and a locomotive could take the carriage and boat down to the head of the rapids, and bring back the carriage. At Priest Rapids the course of the railway could be perfectly straight, obviating any necessity for a horizontal change of direction. The time which would be occupied in making the portage need not exceed two hours at the most, and by having several carriages the process of taking one boat up the incline could go on coincidently with the transportation of another to the head of the rapids, so that, with everything working well, it may be safely estimated that a boat could be taken over every hour with a single track. This would accommodate the river commerce for many years to come, and if it ever became necessary the facilities for transporting boats could be indefinitely increased by building a double track for the return of the carriage, and adding the necessary improvements to the plant.

The class of boats which it will be found most advantageous to run on the Upper Columbia will probably be found to be similar to those now run on the Snake River, and of which the Spokane, Annie Faxon, and Almota are types. The Annie Faxon, the largest of these, is 165 feet long, 37 feet beam, 5 feet depth of hold, and has a measured tonnage of 709 tons.

If we suppose a boat with her load having a displacement of 800 tons, which is probably the largest boat that would demand transportation, the carriage or car on which to transport her must weigh about 100 tons. This 900 tons is the weight to be transported and handled on the railroad. Once up the incline it can readily be handled by a good freight locomotive on a properly constructed track. This would be much more than would ordinarily be taken over, as most of the freight would be down river, and boats would be lightly laden going up stream.

Another very favorable circumstance which would facilitate the operation of a boat railway about Priest Rapids is the very small rise and fall of the river here. I cannot say what the difference between high and low water is, but it is very much less than at most other points on the river, and probably not more than eighteen to twenty feet.

If a canal should be decided on instead of a railway, the route would be the same, along the left bank. The same may be said of an ordinary portage railway for the transfer of freight, &c., from boats at one end to boats at the other end of the rapids.

IMPROVEMENT OF CABINET AND ROCK ISLAND RAPIDS.

Once the river at these rapids is well known to an experienced and skillful steamboat captain, he can take his boat down through both with entire safety, if she be under good headway and with sound and efficient steering apparatus. Of this I have no doubt.

At the stage of water which existed when I passed through, it seemed to me that a good, powerful steamer, lightly loaded, could ascend through both. However, at the best these rapids are not to be considered navigable in their present condition, for ordinary boats heavily loaded could not ascend. Cabinet Rapids can be very much improved; sufficiently so, I believe, by removing some of the rocks which jut out from the left bank and rise from the water towards this bank. There is a stretch of quiet water above these rapids which would allow of being quickened by the removal of these damming rocks.

The removal of 8,000 cubic yards of rock at a cost of about $7.50 per yard, making an expense of $60,000, would be sufficient for the purpose, I believe, and give satisfactory navigation up to the foot of Rock Island Rapids.

Rock Island Rapids are so situated and formed that a steamer, in going up, could take advantage of many eddies, and work her way up by crossing over the ripples from one side to another. There are some sunken rocks and jutting points which might interfere with this, and which should be removed. A careful study of the rapids and experiments with a steamer would determine which of these rocks and points it would be well and necessary to remove, and whether the navigation could be made satisfactory by such means. There is this to be said: for a number of years, until the country becomes well settled, the river transportation demanded will be small in amount, and any expedient which will give passable transportation over these rapids will be of great value in settling the country above.

The final and complete improvement of Rock Island Rapids will undoubtedly require that either a canal or a railway shall be constructed to allow the passage of boats from below to above the rapids.

As at Priest Rapids, so here, I should advocate the construction of a railway, and for the same reasons. To go around Rock Island Rapids proper, a railway would require to be about two and a half miles long and to change direction once, both vertically and horizontally. If Cabinet Rapids cannot be sufficiently improved by working on the rocks of its bed, the railway must be extended down to include them. In this case the railway would be about six miles long, and would not need to change its direction horizontally.

The conformation of the ground is well suited for the construction of a railway. At Rock Island Rapids the right bank of the river rises about one hundred feet to a nearly level plateau, which extends down almost to Cabinet Rapids. In the materials of this plateau the bed of the railway would be easily made, and would be solid and enduring. The plateau widens out considerably at Rock Island Rapids, and extends for about three miles above.

IMPROVEMENT OF THE NESPILEM RAPIDS.

The improvement of the Columbia River from Foster Creek to Mahkin Rapids, the whole system being known as the Nespilem Rapids, is next to be considered. After traversing this portion of the river I came to the conclusion, at first, that it was so bad, and the bad portion so extensive, that its amelioration would be so expensive that the benefits to be derived therefrom would not justify the work. Further reflection however, and study of the country, the river, and methods of improvement, convince me to the contrary, and I thoroughly believe that means can be adopted at a reasonable expense which will permit the passage of boats up and down the river, and that the requirements of commerce will in the future demand and insure its being done.

In this stretch of about twenty-four miles, there are fourteen distinct ripples, some of them a mile or more in length. How much of this stretch can be made navigable for upward-bound boats by work on the river-bed it is impossible for me to say. Probably a considerable portion of it could be. Many of the rapids and ripples are caused by an accumulation of great rocks in the river brought there by ice transportation, and the removal of these would have a very great effect on the current. While I believe that it would be dangerous for a steamboat to run these Nespilem Rapids, yet I believe at the same time that by the removal of some obnoxious rocks and points, and the acquiring of a thorough knowledge of the river, its currents, channels, eddies, &c., it could be done with entire safety, provided no accident occurred on the steamboat itself. I see no reason why good steamers, with careful and experienced captains, cannot make a business of running down through these rapids.

Careful surveys, observations, and experiments could determine which of the rapids can be made to permit the ascent of boats; about the others, boat railways, similar to those proposed for Priest and Rock Island Rapids, can be built.

By a well-considered system of river improvement, and boat railways, I think that the passage of the Nespilem Rapids can be successfully accomplished.

A railway would probably be necessary about Foster Creek Rapids, about the Long Rapids, embracing Kalichen Falls and Whirlpool Rapids, and possibly about Mahkin Rapids, three in all. The first would be about two and a half miles long, the second about four and a half, and the last two miles long.

At the Foster Creek Rapids the ground is favorable for any kind of construction, and a railway would be easily built. At the other places the ground is not favorable, and the construction would be difficult and expensive in comparison to what it would be at any other place where the railway would be needed. It would be still more unfavorable for any kind of canal construction.

To summarize then, the system of improvements that I would advocate to give continuous navigation from Grand Rapids to the mouth of the Columbia River is as follows:

First. The improvement required at the Spokane Rapids, the expense of which would be slight.

Second. A combined system of river improvement and boat railways at the Nespilem Rapids.

Third. A boat railway at Rock Island Rapids, and the improvement of the river at Cabinet Rapids.

Fourth. The construction of a boat railway around Priest Rapids.

Fifth and sixth. The construction of a canal with locks about the Dalles and the Cascades.

The following approximate estimate of the cost of the improvements above the mouth of Snake River is given:

Boat railway around Priest Rapids	$600,000
Boat railway around Rock Island Rapids	400,000
Boat railway around Foster Creek Rapids	400,000
Boat railway around Kalichen Falls, &c	800,000
Boat railway around Mahkin Rapids	500,000
	$2,700,000
Improvement of the river at Priest Rapids	50,000
Improvement of the river at Cabinet Rapids	60,000
Improvement of the river at Rock Island Rapids	25,000
Improvement of the river at Nespilem Rapids	150,000
Improvement of the river at Spokane Rapids	20,000
Total	$3,005,000

In view of the probability or at least possibility of the government, at some future time, undertaking the improvements mentioned, it would seem to be a wise step to secure now the lands which would be needed for the railways and works.

The lands are, I believe, unsurveyed, and strips could be set aside and reserved from sale for the purposes of improvement without cost to the government or hardship to any private individual.

Whatever system of improvement be adopted it would be necessary to have these lands, and I would suggest that proper steps be taken to reserve them.

Besides the method of taking boats up around the rapids by railway, other methods and combinations of methods may be found when the attention of engineers is thoughtfully directed thereto. It is highly probable that in some localities, perhaps in all, a system of warping lines can be arranged which will enable the boats to surmount the most rapid portions of the current, their own power taking them over all the intermediary water between the successive ripples.

A boat provided with a good steam capstan or drum could make fast to a fixed warping line or lines and work herself up over the rapids; or the line could be worked by a steam engine and drum on shore at the head of the rapids, thus giving the boat having hold of the line the additional power required.

Rock Island Rapids, portions of the Nespilem Rapids, and Hell Gate would seem to be well situated for this method of navigation, owing to the favorable conformation of the shores and islands.

There would of course be danger to the boats if the lines should break, but this danger could be very largely guarded against by using strong and specially prepared cables of steel or iron wire, by having facilities for disengaging the cable instantly, by keeping up steam, being thoroughly acquainted with the river, and knowing exactly what to do in case of accident at any point in the transit.

This would be very much less expensive than the boat-railway system, if it could be made practicable.

I am thoroughly convinced that skillful engineers will find some method or methods for giving satisfactory navigation throughout nearly the whole course of the Columbia within our borders, when the time comes that it shall be demanded.

GRAND RAPIDS, KETTLE FALLS, AND LITTLE DALLES.

Grand Rapids and Kettle Falls taken together form an obstruction to the navigation of the river which it cannot be hoped will ever be overcome. There does not seem to be any probability that sufficient commerce will be developed on the upper river to justify the great expense that would be incurred in giving navigation around these two obstructions.

An ordinary portage railroad could be very easily built around them if it should be desirable. Probably a route for a portage along the west bank would be the most economical one to select, if other questions did not come in, to cause the one along the east bank to be chosen. By laying the portage on the east bank, a portion of the Colville Valley Road to Grand Rapids would be utilized.

Above Kettle Falls the river is navigable for twenty-six miles to the Little Dalles. These latter can be ascended by steamers using a line, but this is not, of course, satisfactory navigation. It would not take a very large amount of money to render this obstruction passable. In all probability, however, it will be found when the country becomes settled, and the river above the Little Dalles navigated, that a branch line of railroad will be required from the main Colville Valley up Mill Creek and Echo Valley, and through to the river above the Little Dalles. This branch line, in connection with the portion of the Colville Valley Road running through the lower part of the valley to the river below Grand Rapids, will form a portage road around all these falls. The length of this line by the circuitous route that it would go is about thirty-five miles.

Above the Little Dalles the river is navigable for two hundred and eighty miles to Death Rapids, according to the estimate of Captain Pingstone, or two hundred and twenty-five miles, according to the estimate of Alexander Ross and others.

This extreme upper navigable portion of the river can be used most economically in connection with railroads, a portion of the railroad system giving a portage around the obstructions, and a river, as well as a rail communication, with the country below.

PORTAGE SYSTEM OF NAVIGATION.

As it must be many years before the improvements mentioned in the preceding discussion are completed or even undertaken by the general government, I will give a summary of the portages required to give a continuous line of river navigation from Snake River to Death Rapids, the river remaining in its present condition.

	River.	Portage.
	Miles.	*Miles.*
Snake River to Priest Rapids	73	
Portage around Priest Rapids		11
Priest Rapids to Cabinet Rapids	42	
Portage around Cabinet and Rock Island Rapids		7
Rock Island Rapids to Foster Creek Rapids	90	
Portage around Foster Creek and the rapids of the Nespilem Cañon to Mahkin Rapids		27
Mahkin Rapids to Grand Rapids	122	
Portage from Grand Rapids to above Little Dalles		35
Little Dalles to Death Rapids	225	
	552	80

In the months of February and March, 1880, Capt. Alfred T. Pingstone, of the Oregon Railway and Navigation Company, examined the Columbia from Kettle Falls to the Snake River. His examination was made at a very low stage of water, which must account partially for the difference in the descriptions of rapids, &c., as given in his report and in this. Captain Pingstone is a practical steamboat man and his opinions are entitled to great weight.

CAPTAIN PINGSTONE'S REPORT (EXTRACT).

IMPROVEMENTS NECESSARY TO INSURE GOOD STEAMBOATING.

Proceeding up the Columbia from Ainsworth until Priest Rapids are reached, the river is in an excellent boating condition during the open season of the year; and by making an easy portage of seven miles around these rapids, an equally navigable river is had for fifty miles to Rock Island Rapids.

At Rock Island Rapids, by making a portage of eight miles, a clear river to the mouth of the Okinagan, a distance of seventy-seven miles, would be obtained. These two portages would give excellent navigation at all stages of water.

By making another portage of seven miles from the Okinagan to the head of cañon (no name) the river would be equally navigable to Hell Gate, twenty miles below the mouth of the Spokane.

At Hell Gate, navigation would be doubtful at a high stage of water; but for the proper kind of a steamboat it would be good for two-thirds of the season. Should it be deemed advisable to construct a portage road there, one about a mile long could easily be laid over a flat bench on the left bank of the river.

The boat that would go through Hell Gate at a medium stage of water, would go through to Grand Rapids, a distance of ninety miles above.

I have no hesitation in saying that, with the portages named, a stretch of river 438 miles long (from Wallula to Grand Rapids) would be thrown open to regular steamboat traffic that would be far better than Snake River at even a moderately low stage of water.

In brief, the improvements necessary are:

	Miles.
A portage at Priest Rapids of	7
A portage at Rock Island Rapids of	8
A portage from the Okinagan to Hell Gate of	7
	22
And possibly at Hell Gate a portage of	1

For descriptions at these various rapids see diary.

FROM AINSWORTH TO KETTLE FALLS.

By the use of lines at a medium stage of water, a boat could be taken from Ainsworth to Kettle Falls. Some risk would attend upon such an enterprise; all would not be clear work; but with care and moderate good luck the feat could be performed without serious loss or damage.

FROM GRAND TO DEATH RAPIDS.

As will be seen by the table of distances inserted below, the construction of the portages already suggested would give a navigable river for 427 miles above Wallula. I will state further that by the construction of a portage six or seven miles in length around Grand Rapids and Kettle Falls, a clear river up stream for twenty-four miles could be obtained and a portage—which would not be necessary at a medium stage of water—of a little over a mile at the Dalles would insure good navigation to Death Rapids, a distance of 280 miles further north. I know this from having navigated it with the steamer "49."

Distances.

[Down stream.]

	Miles.
From Fort Colville to mouth of Spokane	70
From Spokane to Hell Gate	20
From Hell Gate to head of cañon	80
From head to mouth of cañon	12
From cañon to mouth of Okinagan	12
From Okinagan to Chelan	32
From Chelan to head of Rock Island Rapids	45
From Rock Island through bad water	8
From thence to head of Priest Rapids	50
From head to foot of Priest Rapids	9
From foot of Priest Rapids to Ainsworth	89
	427

DIARY.

February 28, 1881.—Having secured the services of two Pend d'Oreille Indians, one of whom, twenty years ago, had made the trip down the river when in the employ of the Hudson Bay Company, we left Kettle Falls in a birch-bark canoe, which was about twenty-five feet long and weighed eighty pounds. Kettle Falls are distant from Fort Colville about fifteen miles. They are the most serious obstruction to navigation on this part of the Columbia, being a perpendicular fall of about twenty feet at low water. We embarked in the morning at about eleven o'clock, and proceeded thence down the river for about five miles, when we arrived at Grand Rapids. The river is now at dead low water. These rapids are about one and a half miles in length and have three riffles. The upper and lower ones could be run by boats either up or down stream without the use of lines, but the middle rapid has a fall of about seven feet. It could be run at high water with a line. This would be a proper landing for Fort Colville. We made a portage around the rapid of about one hundred yards, and camped just below Grand Rapids for the night.

March 1.—Left foot of Grand Rapids at 8:20. Three miles below Rickey's Bar there is a high bench of rocks on the right bank of the river coming down. These rocks are in the bend of the river and would form an island at high-water with the channel on either side. It would be no obstruction to navigation. On Rickey's Bar there is some drift, and a few trees standing. Four miles below that, opposite what is called the "Five thousand dollar claim," there is a heavy rapid—very strong water—with bed-rock sticking up on both sides of the river; best channel at the head of rapid is in middle of river, thence down left bank and at the foot to the right bank. The river is then good to Rogers' Bar, about thirty miles below. Shoal riffle at Rogers' Bar. Just below Rogers' Bar there is a large island of rocks, also a riffle running part way across, but a good steamboat channel there. Below, about six miles, there is another bench of rocks with channel on the right bank of the river. Three miles below that is another bench of rocks in the middle of the river; straight channel about a hundred feet wide on right bank. There is a good country along the Columbia from Colville to this point, large flats and valleys running into the river. Back of Rogers' Bar there is a settlement of eight or ten families with promised additions from outside this spring. From this point to Spokane River there is but little good land along the Columbia. There are many bars with quite a number of Chinamen mining upon them. The river has many swift rapids in it, but none that a powerful boat could not make. We camped eight miles above the mouth of the Spokane River.

March 2.—Left camp at seven a. m. River very crooked; very swift; many heavy rapids; mountains high and close in on the river, and heavily timbered. Saw a good many Chinamen mining on the bars. Arrived at Spokane River at nine a. m., and went up and took a look at the new United States post. The Spokane is not navigable, but discharges considerable water. There is as much water in it as in the John Day. The "post" is located on the south side of the Spokane about 2 miles from its mouth. There are three companies stationed there. The location is good; it is on high table land, surrounded by scattering pine timber. Was informed there that the country in the immediate vicinity was settling up fast, and that it would support a large population. Arrived back at the canoe at about three p. m.

Immediately above the mouth of the Spokane is a strong rapid. The river (Columbia) at this point runs between two bars covered with very large bowlders. The channel is straight; current very swift. It would be all a boat could do to stem it at high-water, but by the use of lines for one hundred yards she could make it. The river from this point down to Virginia Bills, a distance of five miles, is very rapid. There are high rolling hills on the left, and mountains on the right. We camped five miles below the mouth of the Spokane.

March 3.—Left Camp at seven a. m. Paddled the first fourteen miles through a cañon. The river is good—not more than a four-mile current. Mountains very high and rocky. In many places the walls of rocks are from 500 to 1,000 feet in height, rising perpendicularly from the river. There is some mining carried on upon what few bars there are in the cañon. At nine a. m. we arrived at Hell Gate. Here the channel makes a complete S. A boat could go through it now, but it looks as though it would be a rough place during high water. There are two big islands of rocks in the river a hundred feet high at this stage of water; a boat could get either up or down. A quarter of a mile below Hell Gate a reef of rocks runs nearly across the river. The channel is on the right bank. From thence on down to a mile below mouth of Sam Poo-el [Sans-Poil] Creek, which comes in from the right bank; the water is strong. Up to camping ground (four miles below Sam Poo-el) the river was good. The timber extends twenty miles below the mouth of the Spokane River. The hills along the Columbia in the vicinity of this creek are much lower than above;

but there is not much good farming land in sight. The country looks barren. No timber in view.

March 4.—Left camp at seven a. m. The mountains close in on the river. Current very swift—from five to seven miles per hour. Ten miles below the Nespilem there is a bad rapid in the bend of the river. Boats could not ascend without the use of a line at this stage of water for at least two hundred feet. From thence on down to the head of the cañon the river is very rapid—high bluffs on one side, high bowlder-bar on the other. For two miles down from head of cañon it is good steamboating. High hills of rocks extend on both sides of the river for over a mile. You could get a boat through this cañon, but it would not do to make a business of running it; there would have to be a portage here. There is a good location for a portage road on the right bank of the river; it could be run across a bend, and * * * it is twelve miles up river from the Okinagan to the foot of the cañon. The road would have to leave the river a mile above Fort Okinagan and cut across the country, striking the river at the head of the cañon—a distance of about seven miles—easy grade over bunch-grass hills—no timber. Fort Okinagan was formerly an important post of the Hudson Bay Company, but is now abandoned. The Okinagan enters the Columbia from the right bank, but, although a large stream, is not navigable for steamboats except at high water, and then only to Osooyoos Lake, seventy-five miles distant from Columbia River, located in British Columbia.

March 5.—Left camp at mouth of Okinagan at seven a. m. Arrived at mouth of Chelan River at eleven a. m., distant thirty-two miles, with only three rapids in that distance. One is about five miles below the Okinagan in the bend of the river. Another rapid is located below the mouth of the Methow River; good enough steamboating; big rocks on both sides; some in the river; water very swift. There is another rapid about ten miles above the Wenatchee—shoal water, bars and rocks. A few miles below Chelan there is plenty of timber for wood. There are a good many pine flats along this part of the river that will be good for settlement. Camped ten miles above mouth of Wenatchee. The river I have passed over to-day is in every way suitable for steamboating.

March 6.—Left camp at 7:10 a. m. The river was good to the head of Rock Island, a distance of twenty miles. The bad water commences about three miles above what is called Rock Island. The Wenatchee River empties in from the right bank, and is a large body of water, but not navigable. Rock Island Rapids, so called, are located in a cañon two miles in length. This cañon contains many rocky islands. There is one which rises from the river to the height of a hundred feet. This cañon would be a rough place for a boat to get through during high-water, but during an ordinary stage is navigable. For two miles (between the cañon and Rock Island proper) there is a good river. Rock Island Rapids proper are not navigable at this stage of water. Boats may be taken up or down at a high stage of water—but always at great risk to the boats. There are two channels—the one on the right bank is widest. The upper end is clear of rocks, but the lower end is crooked and full of high bed-rock. It is cut up in many small channels and so rapid that a steamboat could not stem it without the assistance of a line. The channel on the left bank ends in two little falls at this stage of water, but it would be best to take a boat through at a little above a half stage. Rock Island can never be successfully steamboated in its present condition, but at comparatively small expense can be made navigable at low water. The water is bad for four miles below the island. One place, particularly, is very narrow, crooked, and rocky, and has a fall of five feet in three hundred.

The best farming country we have passed through to-day is the Wenatchee country. I was told by an old settler that there is room there for quite a number of people. They are raising all kinds of grain and fruit (even peaches) there. A good many high bars that we passed to-day would make good farming land. On the mainland timber is scarce; it is a bunch-grass country. We camped about three miles below the island. A portage will probably be necessary at this point, commencing about three miles below Rock Island Rapids, on the right bank, and ending in about four miles. This portage road would pass over a high flat with an easy grade—no excavation necessary if railroad were built there.

March 7.—Left camp at 9:15. We broke our canoe yesterday, and were some time in fixing it. The river is very good to-day. Found only one rapid. It is called "Eagle Rapid" and is located about thirty miles below Rock Island. It can be navigated by steamboats at all stages of water. The river from Eagle to head of Priest Rapids is excellent for boating purposes. We camped at Priest Rapids at six p. m. During the day's run found high banks on either side the entire course. We passed the mouths of two coulées.

March 8.—Priest Rapids are about nine miles in length. They are situated in a semicircular bend of the river. There are five rapids in all from the upper to the lower, inclusive. The water is very swift, but the two riffles at the head are the worst. There is a stretch of five miles of good water between the middle and lower riffles. The latter are full of reefs and bowlders.

By the use of a line at a middle stage of water, a steamboat could be taken over. A portage road across the bend over a flat bar on the left bank of the river would be about seven miles—not to exceed that. There is plenty of drift-wood at the head of rapids. We ran the rapids with our bark canoe, and camped at Ringgold Bar, about forty miles from the mouth of Snake River. Excellent steamboating from Priest Rapids at all stages of water. Country on both sides of river, high plateaus. On left bank, high "white bluffs" rising 180 to 200 feet; on the right, a large flat plateau of bunch-grass country. Think it is good land.

March 9.—Left camp at seven a. m. The river from here to mouth of

Snake River is excellent at all stages of water for steamboating. We arrived at Ainsworth at twelve m., our journey ended. I proceeded to Portland, taking the canoe which so safely has carried us to our destination, while my two Indian companions leave for Fort Colville overland, a distance of 210 miles.

Very respectfully,

ALFRED T. PINGSTONE.

CHAPTER VII.

GENERAL DESCRIPTION OF THE COLUMBIA AND ITS TRIBUTARIES.

In the early development of a country its navigable rivers play a very important part, furnishing natural highways for travel and trade, and bases of operations from which the adventurous pioneer can extend his researches after the unknown attractions of the wilderness As the population and productions of the country increase, and railroads are built in every direction, these artificial lines of communication make the natural river lines of less relative importance. In the full and complete development, however, these water lines furnish transportation for all the slow freight and surplus productions, and act as a regulator upon all of the internal commerce of the country. Their great value in this respect cannot be overestimated, and the general government has for many years shown its wisdom by opening up and freeing from obstructions the natural water-courses within its domain as fast as they are required by the demands of commerce.

The great country drained by the Columbia River is still in its infancy, and it is the cherished scheme of all who are alive to its best interests to see the whole river, or as much of it as is practicable, open to free navigation, and the healthful competition which would grow therefrom.

In these pages I have added as much as I am able to the knowledge of the river and the country drained by it, and trust that it will be useful in any effort that may be made to secure the free navigation of the whole of it, or at least of a very large portion.

Entering the Pacific Ocean near the forty-sixth degree of latitude, this river forms a great arm of the ocean, up which sea-going vessels can go for one hundred miles and more to the foot-hills of the great range of mountains whose snow-clad summit peaks can be seen by the sailor as he nears the foaming breakers at the river's mouth.

The Columbia by means of its tributaries drains the western slope of the Rocky Mountains, from about the forty-second to the fifty-third parallel of north latitude, a distance of about 900 miles, and has a drainage basin aggregating almost 245,000 square miles.

The following table gives the areas drained in the different States and Territories by the most important tributaries:

DRAINAGE AREAS.

	Square miles.
Oregon:	
Willamette (and Columbia below mouth of Willamette)	12,600
Des Chutes	10,000
John Day, Willow Creek, and Walla Walla	12,600
Snake River	17,200
Washington Territory:	
North side Columbia, below Snake	8,000
Columbia, above Snake	30,360
Snake	5,200
Idaho:	
Columbia River	7,600
Snake River	70,040
Nevada, Snake River	6,280
Wyoming, Snake River	5,184
Utah, Snake River	700
Montana, Columbia River	20,800
British Columbia, Columbia River	38,395
Total area drained by Columbia—square miles	244,959

This is an area larger than all the New England and Middle States, with Maryland, Virginia, and West Virginia combined. For purposes of comparison, I give their areas as taken from the last Census Report:

	Square miles.	
Maine	35,000	
New Hampshire	9,280	
Vermont	10,212	
Massachusetts	7,800	
Connecticut	4,750	
Rhode Island	1,306	68,348
New York	47,000	
Pennsylvania	46,000	
New Jersey	8,320	
Delaware	2,120	103,440
Maryland	11,124	
Virginia	38,348	
West Virginia	23,000	72,472
Total square miles		244,260

I also give here for comparison the areas of the principal European countries:

	Square miles.
Great Britain and Ireland	121,230
France	201,900
Germany	212,091
Austria Hungary	226,406
Italy	112,677
Spain	182,758

The drainage area of the Columbia may also for convenience be divided as follows:

	Square miles.
Snake River	104,604
Upper Columbia above junction with Snake	97,155
Main Columbia below junction	43,200
Total	244,959

At a distance of 336 miles from the sea the main river is formed by its two great branches, the southern one being now generally known as the Snake and the northern as the Columbia.

THE SNAKE RIVER.

The Snake River takes its rise in the southern part of the Yellowstone National Park, very near the headwaters of the Madison Fork of the Missouri and the Green River branch of the Colorado, the former flowing to the Gulf of Mexico and the latter to the Gulf of California. From its source the Snake takes a southwesterly course until it comes within sixty miles of the present limits of the Great Salt Lake of Utah. It has been clearly proven that this lake, in the years long gone by, was very much larger than it now is, covering an immense extent of territory, and that its waters found an outlet to the north into the Snake River and thence to the Columbia and Pacific Ocean. The outlet of this ancient lake was determined and its boundaries traced by a party of the Wheeler Survey, who gave to it the name of Lake Bonneville, after the first and most illustrious explorer of this section of the country. The gradual upheaval of the northern portion of the continent has taken away the outlet and left the lake what it now is.

From the vicinity of the Great Salt Lake the river takes a northwesterly course, flowing through a tremendous cañon in which are numerous rapids and falls of great magnitude and beauty, ranking with Niagara and the falls of the Zambesi in Africa. The principal are the Great Shoshone Falls, the American Falls, and Salmon Falls. A number of streams flow into the Snake from the lands to the south and west of its course, principal among them being the Bruneau, Owyhee, Malheur, Burnt, Powder, and Grand Ronde Rivers. The main branches from the east are the Malade, Boisé, Payette, Salmon, Clearwater, and Palouse Rivers.

Nearly all the streams flowing into the Snake may be characterized as mountain torrents flowing through deep cañons, entirely unnavigable and with very little valley lands along their courses.

Some of them deserve more than a passing mention, especially the Salmon, the principal tributary of the Snake. It drains a large extent of country and joins the Snake about fifty miles above Lewiston, and flows through probably the deepest, grandest, and most impassable cañon of any stream of corresponding magnitude in the world.

Nowhere on earth can there be a scene more grand, gloomy, and desolate than where these two rivers join their waters. Both come flowing down with torrential velocity through cañons 3,000 feet in depth, with ragged, black, and almost vertical sides, the milk-white waters of the Snake coursing alongside the clear blue Salmon water for a half mile or more before they finally mingle among the jagged rocks of the stupendous cañon below.

At Lewiston the Clearwater adds its waters, and it is from this point to its mouth that the Snake is at present navigable and navigated by steamers. Steamers can pass, however, nearly up to the mouth of the Grand Ronde, thirty miles above Lewiston; but as there is nothing to call them up they do not now traverse this portion of the river.

A steamer has been run up the Snake for about eighty miles above Lewiston, occupying fourteen days in making the ascent, of which thirteen were taken up in making the last thirty-five miles. The run down was made in one day; I was once informed in five hours. This illustrates the character of the Snake River for purposes of navigation.

The Palouse is the lowest tributary of the Snake, and, although not of any importance as a large stream, it drains an exceedingly fertile and promising country. A large proportion of the best farming lands of Eastern Washington Territory lie along the Palouse and its tributary streams.

THE UPPER COLUMBIA.

The great northern branch which unites with the Snake to form the main river is designated as the *Columbia*, or in contradistinction to the *lower* river, as the *Upper Columbia*.

Amid the universal gloom and midnight silence of the north, a little above the fifty-second parallel of latitude, seemingly surrounded on all sides by cloud-piercing snow-clad mountains, and nestled down in among the lower and nearer cedar-mantled hills, there lies a narrow valley where three streams meet and blend their waters, one coming from the southeast, one from the northwest, and one from the east. The principal one of these three streams is the one from the southeast, which rises in a small lake near the fiftieth parallel of latitude, and flows to the northwest in a deep gap between the main Rocky Mountain chain on the east and the Selkirk Range on the west, to the point of junction, and is the headwater stream of, and bears the name of the Columbia. It is about one hundred and eighty miles long, and is said to be navigable for more than half the way.

The northwestern stream is the extreme northern branch of the Columbia, rising beyond the fifty-third parallel of latitude, and is known among the fur traders and *voyageurs* as *Canoe* River, from the excellence of the bark procured on its banks for canoe building. This is a small river, forty yards wide at its mouth, flowing through a densely timbered valley in which the trees overhang the stream to such an extent as almost to shut it out from the light of heaven, and attain an enormous size, particularly the pines and cedars, one of the latter, measured by Alexander Ross, being forty-five feet four inches in girth at a height of four feet from the ground.

Portage River, the third of this trio of streams, the smallest and the most remarkable of them, is the one which enters from the east. It has its source in the very heart of the Rocky Mountains and flows through a tremendous cleft in the main range between two of its loftiest peaks, Mounts Brown and Hooker. Just underneath these giant mountains, on the divide known as "The Height of Land," lie two small lakes, each about thirty yards in diameter, and which are only a few yards from each other. One has its outlet to the west, Portage River, flowing to the Columbia; the other has its outlet to the east, Whirlpool River, a branch of the Athabasca, which joins the Mackenzie and flows to the Arctic Ocean.

The elevated valley in which these lakes are situated is called the Committee's Punch Bowl, and the nabobs of the fur trade always treated their companions to a bucket of punch when this place was reached, if they had the ingredients of which to make it, and they usually had.

The pass across the mountains by the Portage River, the Committee's Punch Bowl, and Whirlpool River, known as the Athabasca Pass, was for many years the principal route of the British fur traders in going from one side of the Rocky Mountains to the other. This route is far from being an easy one, and a description of the difficulties, dangers, and discomforts attendent upon a trip over it will certainly deter any one from making the journey for pleasure. A great part of the way the traveler has to wade up to his middle in the icy waters of the Portage River. The journey had to be made in the spring before the summer thaws and rains set in, or in the autumn after severe cold weather had locked up the mountain drainage. During the summer the stream becomes an impetuous impassable mountain torrent. Alexander Ross, after making the journey from the Columbia to the Athabasca, thus pictures the delights of the journey up Portage River:

> Let the reader picture in his own mind a dark, narrow defile, skirted on one side by a chain of inaccessible mountains rising to a great height, covered with snow, and slippery with ice from their tops down to the water's edge; and on the other side a beach comparatively low, but studded in an irregular manner with standing and fallen trees, rocks, and ice, and full of drift-wood, over which the torrent everywhere rushes with such irresistible impetuosity that very few would dare to adventure themselves in the stream. Let him again imagine a rapid river descending from some great height, filling up the whole channel between the rocky precipices on the south, and the no less dangerous barrier on the north; and lastly, let him suppose that we were obliged to make our way on foot against such a torrent, by crossing and recrossing it in all its turns and windings, from morning till night, up to the middle in water, and he will understand the difficulties to be overcome in crossing the Rocky Mountains.

The junction of the three streams above alluded to is known as *Boat Encampment.* From this point the Columbia flows nearly due south for about four hundred miles, to where it makes its great bend to the west at the mouth of the Spokane River.

For the first one hundred and fifty miles of its course it flows, as a general thing, through a deep cañon, closely shut in on each side by towering mountains so near to each other as to confine the view to the rocky heights on each side and the sky above. Numbers of small streams come into the main river from the east and west, and generally their waters come in over some towering cliff in the form of a cataract, some of which are very curious and beautiful. One, coming into the river just above the *Dalles des Morts*, is described by a visitor* as follows:

> A little after starting we backed our paddles and stood still for some minutes admiring a striking natural curiosity on the east side. The water of a cataract creek, after shooting over the brink of a bold precipice, falls in a white sheet on to a broad flat rock, smooth as glass, which forms the first step; then upon a second, some ten feet lower down, and lastly, on a third, somewhat lower. It then enters a subterraneous vault, formed at the mouth like a funnel, and after passing through this funnel it again issues forth with a noise of distant thunder. After falling over another step it meets the front of a bold rock, which repulses back the water with such violence as to keep it whirling round in a large basin. Opposite to this rises the wing of a shelving cliff, which overhangs the basin and forces back the rising spray, refracting in the sunshine all the colors of the rainbow. The creek then enters the Columbia.

Numerous islands exist in the river, some of them remarkable for being formed almost, if not entirely, from drift-wood, compressed by the force of the current so closely and solidly together that it seems to have been laid in tiers as by the hand of man. The *Selkirk Range*, whose jagged, craggy peaks are from 7,000 to 9,000 feet high, lies to the east of the river. To the west lies the low *Gold Range* from 2,000 to 5,000 feet high, and beyond this and between it and the Okinakane and the Thompson Rivers the country is generally rolling and covered with bunch grass.

At a distance of about seventy miles from Boat Encampment there is a very bad system of rapids, known to the *voyageurs* as the *Dalles des Morts*. They are about two miles long from end to end. Many a poor fellow has closed his earthly career by intrusting himself in their treacherous waters, and a number of solitary graves are here to be seen, and names of victims never found are carved on the surrounding rocks.

At a distance of about twenty-three miles from the Dalles des Morts, down the river, there is a remarkable height on the east side of the river, partly covered with snow and partly with numerous towering rocks, broken fragments, peaks, and serrated ranges, resembling the turrets, domes, spires, and steeples of a city in ruins. The mist hanging over the place adds to the deception, and the longer this City of Rocks is looked at the more complete becomes the illusion.

Twenty-two miles below the City of Rocks are the Little Dalles, or Narrows, where for about a mile the river is almost completely shut in by mountains and rocks. This is passable by steamers, however, while at the Dalles des Morts steamers are unable to ascend.

Along this portion of the river there occurred in the year 1817 one of those terrible episodes of frontier life, at the thought of which the heart turns sick. On the 16th of April of this year, a party of twenty-three men left Fort George, now Astoria, to ascend the Columbia and cross the Rocky Mountains by the Athabasca Pass. On the 27th of May they arrived at the mouth of the Portage River, or Boat Encampment, after the most severe labors and exposure in dragging their canoes up the rapids and making their way along the rocky shores. Seven men of the party were so weak, sick, and worn out, that they were unable to proceed across the mountains, so they were given the best canoe and some provisions and sent back down the river to Spokane House. After leaving the Rocky Mountains they went rapidly down the river until the Dalles des Morts were reached. Here, in passing their boat down over the rapids by a line, it was caught in a whirlpool and the line snapped, and the boat and all its contents of provisions, blankets, &c., was irrevocably lost. Here the poor fellows found themselves utterly destitute, and at a season of the year when it was impossible to procure any wild fruit or roots. The continual rising of the water completely inundated the beach, which compelled them to force their way through a dense forest, rendered almost impervious by a thick growth of prickly underbrush. Their only nourishment was water. On the third day Maçon died, and his surviving comrades, though unconscious how soon they might be called on to follow him, divided his remains into equal parts, on which they subsisted for several days. From the sore and swollen state of their feet, their daily progress did not exceed two or three miles. Holmes, the tailor, shortly followed Maçon, and they continued for some time longer to sustain life on his emaciated body. In a little while of the seven men only two remained alive, Dubois and La Pierre. La Pierre was subsequently found on the borders of the Upper Lake of the Columbia by two Indians who were coasting it in a canoe. They took him on board and to Kettle Falls, from whence he was conducted to Spokane House. He stated that after the death of the fifth man of the party, Dubois and he continued for some days at the spot where he had ended his sufferings, and on quitting it they loaded themselves with as much of his flesh as they could carry; that with this they succeeded in reaching the Upper Lake, around the shores of which they wandered for some time in search of Indians; that their horrid food at length became exhausted, and they were again reduced to the prospect of starvation; that on the second night after their last meal, he (La Pierre) observed something suspicious in the conduct of Dubois, which induced him to be on his guard; and that shortly after they had lain down for the night, and while he feigned sleep, he observed Dubois cautiously opening his clasp knife, with which he sprung on him, and inflicted on his hand the blow which was evidently intended for his neck. A silent and desperate conflict followed, in which, after severe struggling, La Pierre succeeded in wresting the knife from his antagonist, and having no other resource left, he was obliged in self-defense to cut Dubois's throat, and that a few days afterward he was discovered by the Indians as above mentioned.*

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* Ross.

At a distance of thirty-seven miles below the Little Narrows the head of the Upper Arrow Lake is reached. This is an enlargement of the river, in which, however, very little current is to be detected. It is about thirty-three miles long and three wide. The view along this portion of the river is much more open and the country more level than along the river to the north.

For about sixteen miles the river narrows somewhat until the Lower Arrow Lake is reached. This lake is two and a half miles wide and about forty-two miles long, and is a beautiful sheet of water.

About ten or twelve miles below the southern extremity of the Lower Arrow Lake there comes in from the east the Kootenay River, the largest branch of the Upper Columbia. This river pursues a very circuitous course and drains a large extent of mountainous country. It rises near the fifty-first parallel of latitude and pursues a southerly course for three hundred and fifty miles to the old Kootenay Fort. Here it makes a great bend to the northwest, and after flowing in this direction two hundred miles it makes another turn to the southwest, and in fifty or sixty miles distance reaches the Columbia. Just before making this last turn it flows through a lake about seventy-five miles long and from two to five broad, similar to the Arrow Lakes of the Columbia. This Kootenay Lake and a great part of the river is navigable, but in the lower portion of its course it breaks through the Selkirk range of mountains and has many rapids and falls, one fall of fifteen feet being a short distance from the Columbia. Its principal tributaries are the Mooyie, the Yakh, and the Tobacco rivers, all small streams. This is the first of the tributaries of the Columbia which flows in any portion of its course within the territory of the United States, a great portion of its angular southern bend lying south of the forty-ninth parallel.

The headwaters of the Kootenay are within a very small distance of the headwaters of the Bow River, a tributary of the Saskatchewan, which flows to Hudson's Bay.

Just north of the forty-ninth parallel, and about twenty-four miles down from the mouth of the Kootenay, there enters the Pend d'Oreille River or Clarke's Fork from the east. This is the longer and by far the most important branch of the Upper Columbia, although it is doubtful if it flows as much water as the Kootenay. It drains all that portion of the country lying between the Rocky and the Bitter Root Mountains.

The Flathead River is its principal northern tributary; rising in British Columbia it flows south, through Flathead Lake, a magnificent sheet of water, and unites with the Missoula River to form the main Pend d'Oreille.

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* Ross Cox.

Joshua Pilcher, one of the early explorers of this country, says of this Flathead Lake:

> It is about thirty-five miles in length by five or six in width. This lake communicates with Clarke's River and is formed by its northern branch. It is surrounded by lofty mountains, whose summits are in many cases covered with perpetual snow. It lies in a valley, which is extensive, rich, and would support a considerable population. The valley itself is covered with luxuriant grass, and the foot of the mountains with a variety of timber and vegetation indicating the richest soil. * * *
>
> The upper parts of Clarke's River issue from rugged mountains covered with almost impenetrable forests of pine and cedar, but there are several situations on this river which would admit of settlements to a considerable extent; and though not comparable in fertility of soil to the rich lands of Missouri and Illinois, yet superior to many of the inhabited and cultivated parts of the Atlantic States, where powerful communities have grown up. The Flathead Lake and its rich and beautiful valley are on this fork, and vie in appearance with the beautiful lakes and valleys of Switzerland. At the foot of the mountains, according to information, there is a belt or strip of fertile land, similar to what is seen at the foot of the Alleghany and Blue Ridge.

The Saint Regis Borgia, Bitter Root, Hell Gate, Big Blackfoot, and Deer Lodge rivers are the main feeders of the Missoula.

It is a singular fact that all the large rivers of the north, in some portion of their course, open out into a lake or lakes; it is so with the Pend d'Oreille River, the lake of the same name being an enlargement of the river with a great arm to the south.

This lake is crossed by the forty-eighth parallel of latitude and is situated wholly within the territory of Idaho. This river is of great importance, furnishing, as it does, a practicable and easy pass across the Bitter Root Mountains for a railroad, which is being utilized by the Northern Pacific Railroad Company. The Pend d'Oreille Lake and the river in its vicinity are navigable; no other portions of the river are, as far as I have been able to learn.

At its mouth the river is about fifty yards wide, and pours itself into the Columbia in one fine foaming sheet over a ledge of rocks eight or ten feet high, which bars it across from side to side.

Pursuing its course to the southward through a most beautiful country, the next tributary of importance coming into the Columbia is the Spokane River, which drains a large portion of the country west of the Bitter Root Mountains, is the outlet of Cœur d' Alêne Lake, and, flowing westward, reaches the Columbia where it makes its big bend to the west. No other stream comes into the left bank of the Columbia until it is joined by the Snake.

Several small streams draining the country of the Colville Indians flow from the north, but none of any magnitude until the Okinakane is reached. This noble river is the outlet of a mountain-environed lake, about eighty miles in length, lying between 49° 30′ and 50° 30′ north latitude. There are a number of beautiful lakes in the course of the river below the large fountain lake.

From the region of the Cascade Mountains, and draining their eastern slopes, several streams come in to swell the Columbia—the Methow, Chelan, Entatqua, Wenatchee, and Yakima, being the only ones worthy of notice.

Shortly after joining the Snake the Columbia makes a great bend to the west and receives in succession the Walla Walla, Umatilla, John Day, Des Chutes, Klikitat, Willamette, Cowlitz and other rivers and streams, and, after breaking through the Cascade Mountains, in a gorge unsurpassed on earth for beauty and grandeur, in latitude 46° 15′ it pours its fresh majestic flood through the white-capped breakers of its bar into the placid western ocean.

CHAPTER VIII.

HISTORY OF THE DISCOVERY AND EXPLORATION OF THE COLUMBIA RIVER.

About the same time in the eventful year of 1492 that the indomitable energy and genius of Columbus was rewarded by his discovery of a new world, a conclave of cardinals at Rome rewarded an almost unparalleled course of hypocrisy by electing Alexander VI Pope of Rome.

The temporal power of the Roman Church began about this time to topple and to take its downward course to the pitiful condition which it occupies at present. Alexander VI, "the incarnation of the secular spirit of the papacy," made grand efforts to re-establish and perpetuate the temporal power of the church, yet, notwithstanding all his efforts, this successor of Peter appears for the last time in history as the undisputed bestower of kingdoms and the ultimate tribunal of appeal for Christian nations. Spain and Portugal resorted to him for the adjustment of their claims to the new world; by tracing a line on a map he disposed of three-fourths of the human race, and more than three-fourths of the world of land and water.

Never, according to mediæval ideas, had a Pope exerted his prerogative with equal grandeur to that when Alexander VI bestowed upon the two greatest maritime powers of Europe, to each one-half of the Pagan world of land and water and human beings; that world then just beginning to be dimly seen by the light of the magnificent discoveries of Columbus and his successors.

Upon these extraordinary grants was founded the celebrated *treaty of partition of the ocean*, concluded in 1794, by which the Portuguese were to enjoy and possess the exclusive rights of discovery, trade, conquest, and dominion in all the seas and territories not previously belonging to a Christian prince or people, *east* of a meridian line passing three hundred and seventy leagues west of the Cape Verde Islands, and the Spaniards were to possess all seas and all Pagan lands *west* of that line.

The two nations having thus, under the sanction and guarantee of the highest power in Europe, settled the conditions by which they appropriated to themselves the entire Pagan world, without regard to the claims or desires of anybody else, each continued its search for a navigable passage to India.

The Portuguese were soonest successful, by sailing around the southern extremity of Africa, and establishing their colonies and influence in many of the regions of Southern Asia. They also obtained possession of Brazil, which was found to lie to the *east* of the dividing meridian, very much to the exasperation of the Spaniards, who had expected by the treaty of partition to have exclusive dominion over the countries lying to the west of the Atlantic.

The Spaniards labored with great earnestness and success in planting colonies in the West Indies, and in exploring the coasts in the vicinity, which they soon ascertained to be the borders of a great continent.

With the object of ascertaining the extent of this continent, they persevered in their examinations, in which they were encouraged by the constant assurance of the natives of the coasts and islands respecting the existence of a great sea and rich and powerful nations towards the setting sun.

In the year 1513 this great sea was discovered near where Panama now stands by Vasco Nunez de Balboa. This was naturally supposed to be the Southern Ocean which bathed the shores of India, and as its proximity to the Atlantic was at the same time ascertained, it was very reasonably hoped that the two oceans would be found to be connected in such a manner as to afford a speedy and safe passage for ships from one to the other. This hope found encouragement in the fact that a Portuguese navigator named Cortereal claimed that in 1499 and 1500 he sailed through a narrow channel, named by him the Straits of Anian, into another great sea communicating with the Southern or Indian Ocean.

The great hope was, however, dispelled, as the explorations soon proved conclusively the entire separation of the oceans in the regions near the West Indies.

In the year 1520 Fernando Magellan discovered and sailed through the strait bearing his name, south of the American continent, into the great ocean discovered by Balboa, and proceeding westward, India was reached, and for the first time in the history of mankind the world was circumnavigated.

This route for reaching India by the Straits of Magellan was not satisfactory, owing to its length, difficulties, and dangers, and the search was still continued for other and more direct channels from the Atlantic to the Southern Ocean.

The wealthy and powerful Empire of Mexico was discovered in 1518, and a few years after it was conquered for the Spanish Crown by Hernando Cortes, after one of the most heroic and cruel campaigns recorded in human annals.

When the conquest of Mexico had been completed the Spaniards immediately turned their attention to the northwestern coast of America. Their expeditions by sea and land in that direction were numerous, and Cortes himself set the example by undertaking several of the earliest at his own expense and conducting one of them in person. The Emperor had exhorted him to explore the northern seas in search of "the secret" of a strait which should abridge the voyage from Spain to the East Indies, and he willingly engaged in the new enterprises of extending the Spanish power into other and as yet unexplored regions, and of solving, perhaps, the long-studied problem of a direct northern passage by water to Cathay.

The belief in the existence of such a northwest passage to India, joining the Atlantic in the position variously assigned to Cortereal's Straits of Anian, was wide spread among the maritime nations of Europe, and, all joining in the search, many voyages of discovery were made along both coasts of North America during the sixteenth and seventeenth centuries. Many false reports of the discovery of the desired channel were circulated, the effects of which reports were to spur all to greater exertions, and to promote very materially the explorations in the western world.

Foremost among all on the western coasts were the Spaniards, urged on by the indomitable Cortes. He and his successors on the vice-regal throne of Mexico gradually extended the knowledge of the coasts. The vacillating and selfish policy of Spain, however, greatly hindered her own subjects from pursuing their explorations with vigor, and her claim to exclusive dominion over all the western world deterred mariners of other nations from making persistent efforts.

Until the beginning of the seventeenth century the Spanish navigators pushed their voyages of discovery as far as they could along the coasts of Western America, and then they ceased almost entirely for a hundred years and more, owing to the change in the policy of Spain. She had ceased to desire the existence of a northwest passage from Europe to the Pacific, because, though such a passage might in some respects be useful to her, it would be greatly more injurious to her in other respects, inasmuch as it would bring down upon her possessions in the Pacific and Indian Seas the piratical cruisers of the northern nations of Europe. The expeditions of Drake and Cavendish had shown that the circuit of Cape Horn did not furnish to Spain a complete security for her possessions in the Pacific. Still more alarming would have been their insecurity if accessible by an easy passage from the vicinity of Hudson's Bay.

In this connection, and illustrating the policy of Spain, it may be interesting to know that in the time of Philip II it was proposed to cut a canal through the isthmus of Panama for the passage of ships from one ocean to the other, and two Flemish engineers were sent to examine the place with that object. They, however, found the obstacles insuperable, and the Council of the Indies at the same time represented to the

King the injuries which such a canal would occasion to the monarchy, in consequence of which his majesty decreed that no one should in future *attempt, or even propose, such an undertaking under penalty of death.*[*]

All this time the Columbia was pouring its undiscovered waters into the Pacific, and the Spanish and English navigators who ventured into this western ocean went blindly by it.

Discovery in the North Pacific was revived by Russia, who, in consequence of her Asiatic possessions, very naturally turned her attention to the opposite coast of America. The voyage of Behring and Tschirikow, in 1728, 1729, and 1741, led to a more exact knowledge of the relative bearings of the Asiatic and American coasts in the high northern latitudes, and to the Russian establishments on the Aleutian Islands and the promontory of Alaska.

These events alarmed Spain and stimulated England, and the numerous voyages of these two nations to the northwest coast ensued.

Passing by those voyages which added nothing to the knowledge of the Columbia, or gave no clue to its existence, we come to the years 1774 and 1779, when three exploring voyages were made by order of the Spanish Government, in which the west coasts of America were examined as far north as the sixtieth degree of latitude. The second of these voyages was under the command of Capt. Bruno Hecata, and he, on the 15th of August, 1775, arrived opposite an opening, in the latitude 46° 17′, from which rushed a current so strong as to prevent his entering it. This circumstance convinced him that it was the mouth of some great river, or, perhaps, of the straits of Fuca, which might have been erroneously placed on his chart. He in consequence remained in its vicinity another day in the hope of ascertaining the true character of the place, but, being still unable to enter the opening, he continued his voyage towards the south.

On the opening in the coast thus discovered Hecata bestowed the name of *Enseñada de Asuncion*, or *Assumption Inlet*, calling the point on its north side *Cape San Roque*, and that on the south *Cape Frondoso*, or *Leafy Cape.* In the charts published in Mexico soon after the conclusion of the voyage, the entrance is called *En Señada de Hecata*, or Hecata's Inlet, and *Rio de San Roque*, or river of *Saint Roc.* It was undoubtedly the mouth of the great river of the western side of America; the same which was, in 1792, first entered by the ship Columbia, from Boston, under the command of Robert Gray, and has ever since been called the Columbia. The evidence of its first discovery by Hecata on the 15th of August, 1775, is unquestioned.

By this time the power of Spain in the New World had become very much reduced, owing to the continual and daring warfare and explorations carried on by the gallant sailors of Britain and her American colonies.

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[*] Greenhow.

The Pacific was now open to the adventurous sailors and traders of all nations.

In the mean time the English and French, and their American descendants, had been pushing their discoveries to the west from the Atlantic coasts, and each year saw something added to the knowledge of the great interior of America. To the French and Belgian officers and missionaries must be given the credit for the most extended and daring explorations and surveys.

From the Indians among whom they sojourned they derived a vague knowledge of a great river flowing to the west, and upon nearly all the maps of America published during the early part of the eighteenth century may be found one or more such rivers represented. These rivers were given the name of *River of the West*, *River Thegaya*, *River Aguilar*, or some other, and were represented on the authority of accounts received from the Indians, or of erroneous or fabulous accounts of voyages along the North Pacific coasts.

Capt. Jonathan Carver, of Connecticut, spent the years 1766-'67-'68 among the Indians of the Upper Mississippi, and ten years later published an account of his travels, &c., in which he several times speaks of this as the great river of the west, or the Oregon, or Origan.

This is the first mention of the name Oregon. Mr. Greenhow says that much labor has been expended in vain to discover its meaning and derivation, and that it was most probably invented by Carver.

Although it does not seem possible to determine with certainty the origin of the word Oregon, it does not seem at all probable that it is a meaningless word invented or coined by Carver.

It has been claimed, and not without some reason, that it is from the Spanish word *Oregano*, the wild marjoram, *Origanum Vulgare* L, found growing in abundance along the coasts. It also may be from the Spanish word *Oreja*, the ear, or some of its derivatives, as *Orejon*, or *Orejones*, signifying dried fruits, and in the familiar language of Spain signifies *dog's-ears*, an *ear-pulling*, &c. A derivative word *Orejera* signifies a sort of ear-ring worn by Indians.

Carver did not write his book until ten years after he finished his travels and returned to England, and it is very probable that he heard the word or saw it in some Spanish chronicle and made use of it in his own narrative.

The expedition which left England in 1776, under the command of the intrepid navigator, Capt. James Cook, made known to the world the immense profits which could be derived from the commerce in furs between the Pacific coasts of America and China. In this trade were soon engaged a number of ships sailing under various flags and commanded by men of different nationalities, but principally by Englishmen.

Captain Meares, sailing in 1788 under the flag of the British East India Company, searched for Hecata's river of Saint Roc, but, instead of finding the river, he found in the place where it was located on the Spanish charts a large bay, which he was unable to enter and to which he gave the name of Deception Bay; to the northern promontory he gave the name of Cape Disappointment, which name it still bears. He explicitly denied the existence of any such river as the Saint Roc.

In the summer of 1787 the *Columbia* and *Washington*, commanded by John Kendrick and Robert Gray, were fitted out in Boston for trade on the northwest coast. The Washington, commanded by Gray, made the northwest coast in August, 1788, near the forty-sixth degree of latitude, where she came near being destroyed in her efforts to enter an opening, which was most probably the mouth of the great river afterwards called by her commander the Columbia.

Gray remained on the coast during 1789, engaged in explorations and trading voyages, in the course of which he "entered and sailed up a great arm of the sea for fifty miles in a southeast direction and found the passage five leagues wide." This was the Strait of Juan de Fuca, discovered by the old Greek pilot in 1592, and seen, but not entered, by Berkeley in 1787.

In the latter part of the year (1789) Gray sailed in command of the Columbia to China, which he reached in December, and from thence sailed around the Cape of Good Hope, and arrived in Boston August 10, 1790, having carried the flag of the United States for the first time around the world.

Kendrick, in command of the Washington, remained and made examinations of the northwest coasts, and must be considered as the first person belonging to a civilized nation who sailed entirely through the Straits of Fuca after its discovery by the Greek pilot in 1592. He sailed to the eastward through the Strait of Fuca, then northwestward through the Straits of Georgia and Queen Charlotte's Sound to the Pacific, thus establishing the insulation of Vancouver Island.

In September, 1790, Gray, still in command of the Columbia, sailed from Boston, and in June, 1791, arrived on the northwest coast and remained, trading and exploring about Queen Charlotte's Island, until the spring of 1792, when he took his departure on an expedition southward along the coast. Returning to the northward, he, on the 29th of April, met Vancouver near the Straits of Fuca, and, among other things, informed him that in the latitude 46° 10′ he had been off the mouth of a large river, where the outsetting current was so strong as to prevent his entering it, although for nine days he tried to do so.

Vancouver and his lieutenant, Broughton, had just finished a very careful examination of the coast from Cape Mendocino to the Straits of Fuca; had noticed the Deception Bay of Meares, in latitude 46° 19′, and that here the sea changed from its natural to river-colored water, but did not consider the opening worthy his attention, and from the line of breakers deemed it inaccessible. He records his emphatic disbelief in the existence of any safe port or large river along the part of the coast examined by him.

After parting with the English ship, Gray sailed along the coast to the south, determined to solve the question of the existence of the river. He went first into a safe and commodious harbor, now known as Gray's Harbor, and on the 11th of May he entered his desired port, running in, with all sails set, between the breakers (which had been pronounced impassable by Meares and Vancouver), and came to anchor in a large river of fresh water, ten miles above its mouth. He afterward, keeping along the northern bank, proceeded up the river for twelve or fifteen miles further, at which point, having taken the wrong channel, he turned back and spent a week in vain attempts to get back to sea before he succeeded.

On leaving the river, Gray gave it the name of his ship, the *Columbia.* Attempts have been made to fix upon it the name of Oregon from Carver's indistinct narrative, but have not succeeded. Gray gave the name of Point Adams to the southern point and Cape Hancock to the northern point at the river mouth.

This first discovery and entrance into the Columbia River by Gray, an American, gave the United States their principal claim to the territory drained by the river, and is thus a very important episode in the history of the river and of the country known as the Oregon region.

After leaving the Columbia, Gray fortunately met with the Spanish Commander Quadra, to whom he gave an account of his discovery and a chart of the mouth of the Columbia. In the controversy which afterward arose between the United States and Great Britain for the possession of Oregon, "it was this chart that outflanked the scheming of Vancouver and gave the broad estate of silver-tented Hood to free America."*

In October of the same year, 1792, Lieutenant Broughton entered the mouth of the Columbia in the Chatham and found there the brig Jenny, from Bristol. Broughton examined the river for about one hundred miles from its mouth, going up it in a small boat to about where the town of Vancouver now stands.

The discoveries of Gray, Vancouver, Broughton, Kendrick, and others, added largely to the knowledge of the country and attracted the attention of mariners and merchants.

Many vessels were now employed in carrying on the trade with the Indians. This trade, owing to the peculiar relations existing among the nations of Europe and their colonies, both with each other and with China, was almost entirely in the hands of citizens of the United States, and it is certain that previous to the establishment of Astoria in 1811 many vessels entered the Columbia.

After the transfer of the French possessions in America to the United States in 1803, the government of our country, under the enlightened and far-seeing Jefferson, became imbued with the desire of obtaining an accurate knowledge of its new western territory, with a view to the ultimate objects of colonization and commerce. In furtherance of this desire a number of expeditions were fitted out, whose explorations resulted in geographical discoveries of great importance.

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* Simpson.

By far the most important of these expeditions was the one intrusted to the command of Captains Lewis and Clarke, who were directed to ascend the Missouri, cross the Rocky Mountains, and trace the Columbia, the great river of the west, from its sources to the sea, and determine thus the most direct and practicable water communication for the purposes of commerce.

Probably no two men ever had a task given them of greater difficulty and magnitude, and involving the exercise of more skill, wisdom, intrepidity, discretion, and all manly attributes, and which, after an "experience epic in the grandeur of its unwitnessed valor," was carried to a complete and successful termination, than had these two men, Captains Lewis and Clarke.

The history of man furnishes few instances in which so much has been added in so short a space to the geographical knowledge of the world, and which has stood the test of time like that gathered and recorded by them. These travelers began the ascent of the Missouri in 1804 and spent the winter of 1804–1805 at Fort Mandan. The next season they continued up the Missouri to the three forks, called by them Jefferson, Madison, and Gallatin; they continued on up the Jefferson Fork and crossed over to the west and struck the Salmon River. This they found they could not descend, owing to its deep cañons, falls, and rapids, and so they went north, and after great suffering among the mountains they reached the Kooskooskee or Clearwater, where it is navigable for canoes. They made boats and proceeded down this stream to its junction with the Snake River, and on down this great branch to the main Columbia, which they explored to its mouth, reaching the Pacific in December, 1805. They remained during the winter of 1805–1806 near the mouth of the Columbia, and returned the next season by nearly the same route by which they had come.

Thus, only seventy-five years ago, was this river in its upper portions first navigated by white men. Their dug-out canoes are now replaced by stately steamers bearing great loads of precious grain from the most fertile regions on the earth, then occupied and roamed over alone by savage men and beasts.

For crossing the plains and mountains the iron horse has replaced its more frail and fleshly brother, and the scream of steam is now heard proclaiming the doom of savagery and the advent of civilization and refinement.

Mr. Astor's attempt to found a fur-trading empire on the Columbia and its tributary lands and streams is the next important era in the history of the Columbia. One expedition was sent by sea and one by land.

The first, in the ship Tonquin, sailed from New York September 8, 1810, and arrived at the mouth of the Columbia on the 22d of March, 1811, and entering it the party established their fort and trading post, to which they gave the name of Astoria.

The land expedition under Mr. Wilson P. Hunt was organized at Montreal, Mackinaw, and Saint Louis, which latter place it left October 21, 1810. The party spent the winter of 1810–'11 on the banks of the Upper Missouri, and from thence started in the spring of 1811 across the mountains and reached the headwaters of the Snake River, down which they tried to make their way. After complicated and almost incredible sufferings from hard travel, cold, thirst, and hunger, and annoyances from the insolence and craft of the Indians, surpassing all that is told of any equally well appointed body of travelers west of the Rocky Mountains, finally, on January 21, 1812, the portion of the original party remaining with Mr. Hunt came in sight of the Columbia River near the mouth of the Umatilla, and proceeding down it arrived on the 15th of February at Astoria.

It was not, however, until the 11th of May, 1812, that all the straggling members of the party got to their desired haven at the mouth of the great river.

While the land expedition was thus struggling painfully across the mountains and down the great southern branch of the Columbia, and the Astorians were engaged in preparing and laying out their future homes and trading with the neighboring Indians, the Northwest Fur Company had not been idle.

In 1810 an expedition under Mr. David Thompson, the astronomer and surveyor of the company, started from Canada with the hope of reaching the mouth of the Columbia before Astor's parties, of whose plans they were cognizant, and forestalling them in the occupation and trade of the country bordering the river. This party experienced so many difficulties and delays in crossing the Rocky Mountains that they were obliged to winter near the headwaters of the Columbia under the fifty-second parallel of latitude.

In the spring of 1811 they hastened down the river, building huts and raising flags at various places by way of taking possession of the country, and arrived at the mouth of the river on the 15th day of July, and found, much to their chagrin, that they had been forestalled by Astor's sea party.

Mr. Thompson and his party were the first white persons who had navigated the Upper Columbia, or traversed any part of the country drained by it.

Eight days after Mr. Thompson's arrival at Astoria Mr. David Stuart, one of the Astoria partners, with a detachment set out on a voyage up the river to establish a trading post in the interior. The place selected was the level prairie at the junction of the Okinakane and Columbia, which point was reached on the 1st of September, 1811. This post was occupied for many years and was an important center of the fur trade. Now, however, no white men live near it, and it has been so completely destroyed that not a vestige of it remains.

In the following year, 1812, Fort Spokane, or, as it was commonly designated, Spokane House, was established by a party of Astorians under Mr. Clarke. This was situated near the junction of the Spokane and Little Spokane Rivers, as they are now designated.

Trading posts had previously been established by the Northwest Fur Company in the Flathead and Kootenay countries.

From Fort Okinakane and Spokane House, parties supplied with goods were sent out to trade with the Indians and collect furs, and to examine the country, particularly in reference to its fur-producing qualities and the character and number of its Indian inhabitants. In the autumn of 1811, after building the fort, Mr. Stuart left Okinakane and proceeded up the river of that name, tracing it to its source; he then crossed over to the Thompson River and wintered among a powerful nation called the She-Waps (now written Shuswaps). He returned to Fort Okinakane in March, 1812, and brought the first authentic information concerning the country which he had visited. From Spokane House Mr. Pillet conducted an expedition into the Kootenay country and gained much information concerning it. As illustrative of the hostility existing between the different fur companies it is recorded that he met and fought a duel with Mr. Mantour, the agent of the Northwest Company—pistols at six paces—in which affair neither were mortally wounded.

Mr. Farnham, from the same post, crossed the Bitter Root and Cœur d'Alêne Mountains, and visited the Selish or Flat Head country, seeing much of the region and adding largely to the store of knowledge concerning the basin between the Rocky and Bitter Root Mountains.

Mr. McKenzie established a temporary trading post among the great Sha-hap-tan or Nez Percé nation, and learned what he could about the headwaters of the Snake. These Indians, however, were found to be more devoted to war and buffalo hunting than to the hard drudgery incident to the taking of beaver. They were rich in horses and able to procure all their necessities by the sale of their steeds. In consequence the trading post among them was abandoned.

A number of books have been written and published giving accounts of the adventures and expeditions of these early fur traders, which contain much valuable information, and are interesting reading as giving the first accounts of large portions of the country. The most noteworthy of these works are the volumes of Alexander Ross on the "*Fur Hunters of the Far West*," Ross Cox's "*Adventures on the Columbia*," "*Franchere's Narrative*," Ross's "*Adventures of the first settlers on the Oregon or Columbia River*." All these men were clerks and partners in the fur companies of whose transactions they treat. To these must be added

Astoria, Washington Irving's charming account of Astor's great enterprise.

In the fall of 1813, the fortunes of war then raging between the United States and Great Britain compelled the transfer of the Astor or Pacific Fur Company to the Northwest Fur Company, which, from this time, carried on the trade with the Indians which had been commenced by the former.

From this time onward for many years the history of the Columbia River country is the history of the operations of the Great Northwest and Hudson's Bay Companies, and of the efforts of private parties to get a share in the profits of the fur trade.

The quarrels continually going on between the companies and private parties caused attention to be directed to the country, and it began to be talked about, and emigration schemes to be discussed.

In 1818 Fort Nez Percé, or Walla Walla, was built on the Columbia, about eleven miles below the Snake, where Wallula now stands. This it was designed to make the headquarters of the fur trade east of the Cascade Mountains.

In 1821 the Hudson's Bay Company and the Northwest Company were merged into one, and the united company then worked with all its energy, pushing its trade, and holding its monopoly against all comers.

In 1824 the headquarters of the trade was removed from Fort George or Astoria to Vancouver, and the old Fort Vancouver was built. This was the chief and central point of the commercial transactions of the entire Northwest for many years.

Missionaries began now to arrive and settle among the Indians, and a few adventurous emigrants to drift in, some by sea and some by land.

The Government of the United States sent agents to examine into and report upon the condition and prospects of this western Columbian country, and the expediency of erecting a military and naval establishment on the Columbia began to be discussed among the authorities at Washington.

The geographical knowledge of the country was greatly augmented in the years 1832-'33-'34 by the examinations and surveys of Captain Bonneville. He spent the winter of 1832-'33 about the headwaters of Salmon River, and learned a great deal about that section of the country. During the winter of 1833-'34 he visited the Columbia, passing down the Snake River Valley through the Grand Ronde and over the Blue Mountains to Walla Walla. He returned to Bear River, and again in 1834 he made a second visit to the Columbia.

Captain Bonneville's maps are the first to correctly represent the hydrography of the regions west of the Rocky Mountains, and determine the existence of the great interior basins without outlets to the ocean, to prove the non-existence of the Buenaventura and other hypothetical rivers, and to reduce the Willamette to its proper length.

The exploring expedition under Commander Charles Wilkes of the

United States Navy filled up with authentic information another great blank in the maps of this western country.

The expedition arrived in Oregon in 1841, when a party under Lieutenant Johnson was dispatched up the Nisqually, crossed the Cascade Mountains near Mount Ranier, and reached the Columbia near the mouth of the Wenatchee. Thence they proceeded up the river to Fort Okinakane, on to the mouth of the Spokane, and up to Fort Colville. They then turned south, and going through the Colville Valley, visiting Walker and Eel's Mission, and reached the Kooskooskia or Clearwater about forty miles below where Lewis and Clarke struck it, and keeping to the west went to Fort Walla Walla. From Walla Walla the party kept up the Yakima River to its source, and crossing the mountains reached the Nisqually and the point from whence they started.

In this expedition the Columbia was surveyed up as far as the Walla Walla, and a party was sent up the Willamette Valley, and crossed over to the sources of the Sacramento, which river they followed down to the Bay of San Francisco.

The next great explorer to appear upon the scene is Capt. John C. Fremont. This active, energetic, and intrepid man, who has been dubbed the *Great American Path Finder*, and whose travels and adventures have been more talked about and written about and popularized than have those of any other American explorer, in 1843 crossed over from the Great Salt Lake Basin to the headwaters of the Snake River. He followed on down this and Boisé River to the mouth of the latter, where he crossed the Snake and kept on down it to Burnt River, up which he proceeded to its sources, and then crossed the Blue Mountains and entered the valley of the Walla Walla, and followed it to its junction with the Columbia. From this point, at which was situated old Fort Walla Walla, or Nez Percé, he traveled by land and water to Fort Vancouver, where he arrived in November, 1843.

Leaving Vancouver after a short stay, Fremont proceeded to the Dalles, and thence up the valley of the Des Chutes until near its head, when he left it and crossed over a low timbered country into the upper portion of the Klamath Basin. Here he turned east and visited Summer Lake, Lake Abert, and Christmas, or Warner Lakes, and thence on to Pyramid Lake and the south. The latter part of his journey was performed amidst the snows and cold of winter, and his party performed almost incredible labor, and suffered terrible hardships.

During all the long years in which the Oregon region was being first explored and settled, a dispute had been going on between the United States and Great Britain in regard to its ownership, which at different times waxed so fierce that it threatened war between the two countries.

Fortunately an arrangement was finally arrived at, and the boundary line between the British and American possessions fixed at the forty-ninth parallel of latitude. On the 15th of June, 1846, the treaty was signed which gave to our country the extensive Oregon region, composing the present State of Oregon, and the Territories of Washington and Idaho. This great region was organized into a Territory by act of Congress, approved August 14, 1848, and on March 3, 1849, General Joseph Lane, the first Territorial governor, arrived at Oregon City, and proclaimed the inauguration of the new régime.

About this time strange rumors began to circulate through the populous portions of the East; rumors from the regions of the setting sun, far beyond the Rocky Mountains; rumors of rivers and mountains of gold in the beautiful sunny land so lately wrested from the swarthy, cruel Spaniards. Days and months passed on and these rumors, ever increasing in their grandeur, flew to the East, and soon there were to be seen countless multitudes slowly and laboriously crossing the plains and mountains, or crowded in ships, coming by Cape Horn or the Isthmus, all coming with inflamed imaginations to worship at the fateful golden shrine.

In the minds of those inclined to wander, there was then no room for Oregon and her unromantic prospects; the lust for gold and swift and countless riches inspired all and left place for nothing else. So Oregon and her noble river were left waiting, waiting during many a month and year, for the allurements of her golden southern sister to prove to many a myth and a delusion.

Soon, among the comfortless, hungry, blood-stained camps of California, it began to be talked about that gold could be procured from the soil and amidst the plains and forests of Oregon; gold procured, not in a wild and burning struggle, at the expense of all noble and Christian attributes, but by honest, faithful labor, sure of reward, amid the comforts and quiet joys of home, surrounded by the refining and loving care of woman. Then the tide of emigration turned Columbia-wards, and it has never ceased; those who came, came as the Pilgrim Fathers to build up a substantial empire founded on the only true and certain foundation, the honest homes of honest men and women.

And now the curtain rises again, and another grand idea is uplifted and takes hold of the minds of all men who are interested in Oregon, and in the unity and prosperity of our whole country. It is the idea of uniting the East and the West, wedding them together by the iron bands of a trans-continental railroad. To find a proper route for the iron horse to travel through the great interior country, government aid was invoked and cheerfully given, and in 1853 was organized the Pacific Railroad surveying expedition, which, more than all others, has added accuracy and extent to our knowledge of the geography of the northern and northwest portions of the United States.

To Gov. I. I. Stevens, of Washington Territory, was assigned the general charge of the surveys between the forty-seventh and forty-ninth, and to Capt. George B. McClellan, of the Corps of Engineers, was assigned the western division, whose duties were to explore the passes of the Cascade Range, meeting the eastern party between that range and the Rocky Mountains.

The reports and maps of the Pacific Railroad Surveys are embraced in thirteen quarto volumes, and contain a vast amount of authentic and valuable information.

During the continuation of these surveys, in 1853–'54–'55, the Columbia itself and many of its branches were examined and surveyed.

Lieut. John Mullan, in charge of one of the surveying parties, operated extensively in the region lying between the Rocky Mountains and the Bitter Root Mountains, and down by the Koos-koos-kia to Walla Walla.

Lieutenant Saxton, accompanied by Lieuts. Arnold and Macfeely, went from the Dalles via Walla Walla, Palouse, Spokane, and Cœur d'Alêne Rivers to Clarke's Fork, Bitter Root Fork, and thence to the mission of Saint Mary. Lieut. Macfeely returned to the Dalles by the Nez Percé trail up the Bitter Root and westward through difficult mountains to the Koos-koos-kia.

Lieutenant Donelson left Fort Benton and traveled in a southwesterly direction, crossing the main range of the Rockies at Cadotte's Pass, thence down the Blackfoot Fork to Saint Mary's. He then passed from the Bitter Root to the Jocko, and, following the latter to its mouth, entered the valley of Clarke's Fork, followed it to a point twelve miles below Lake Pend d'Oreille, crossed to the Spokane River, and proceeded about twelve miles west, where he joined Captain McClellan's party. Thence following an Indian trail, crossing the Snake at the mouth of Palouse, the party went to Walla Walla.

Mr. A. W. Tinkham and Mr. F. W. Lander made reconnaissances from Fort Benton westward to the Columbia waters. Dr. George Suckley descended the Bitter Root, Clarke's Fork, and Columbia Rivers in a canoe, making several portages and arriving safely at Vancouver.

The main party of the western division under Capt. George B. McClellan left Vancouver and proceeded in a northerly direction to the Cathlapoot'l; thence in an easterly direction south of Mounts Saint Helens and Adams; thence northwest, crossing the Atahnam, Nachess, and Wenass Rivers, up the valley of the Upper Yakima to the Yakima Pass, which was examined; thence he proceeded to Kittitas; thence north to the Columbia; thence up its right bank to the Okinakane, which was examined up to Osooyoos Lake. From Osooyoos Lake the party crossed the dividing ridge and reached Kettle River, which they followed to the Columbia at old Fort Colville; thence they followed up the Colville Valley and over to the Spokane, where, being joined by Governor Stevens, the whole party proceeded to Walla Walla.

Lieut. S. Mowry examined a route leading from Wenass River in a southerly direction to the Dalles of the Columbia. Lieut. H. C. Hodges joined McClellan's party at Kittitas, having marched from Fort Steilacoom. His course was easterly to the Stkamish River; thence along that stream to the Nachess Pass; thence along Nachess River.

Mr. Tinkham, with ten Walla Walla Indians, in January of 1854, crossed the Cascade Mountains by the Snoqualamie Pass and followed down the Snoqualamie River to Seattle.

Lieutenant Grover made a winter journey in January and February, 1854, with a dog-train, from Fort Benton, via Fort Owen, Clarke's Fork, and Fort Walla Walla, to the main Columbia River.

In the fall of 1854 Mr. Doty, with a party, left Fort Benton for Olympia. He went up the Teton River and crossed over to the Bitter Root River. Leaving the Bitter Root Valley, he proceeded by way of the Saint Regis Borgia River to the Cœur d'Alêne Mission, whence he pursued a southwesterly course to Fort Walla Walla. Leaving Walla Walla, he went up the Columbia to the Yakima River; thence up that stream to its source; thence through the Yakima Pass to Olympia.

In 1855 an exploration and survey for a railroad route from the Sacramento to the Columbia was made by Lieutenants Williamson and Abbot, of the Topographical Engineers. As a matter of curiosity, I may here state that the escort of this expedition was commanded by Lieuts. H. G. Gibson, George Crook, J. B. Hood, and P. H. Sheridan, all soon to achieve great distinction in the civil war. The Des Chutes and Willamette Rivers and their valleys were very carefully examined by parties of this expedition.

A great mass of information concerning the geography of the Columbian Basin and other portions of the great west had been collected and was on file in the departments at Washington. Most of this was in the form of reconnaissances, and few of these possessed any great accuracy, and the geographical positions were very uncertain and ofttimes conflicting.

To Lieut. G. K. Warren, of the Corps of Engineers, was given the task of compiling all this information on a map of the country between the Mississippi River and the Pacific Ocean. His instructions were to—

> Carefully read every report and examine every map of survey, reconnaissance, and travel which could be obtained, to ascertain their several values and to embody the authentic information in the map.

This duty he completed, and submitted his report on the 1st of March 1858. His task involved an immense amount of patient, painstaking research and care, combined with the soundest judgment, and was most successfully performed, and the map was for many years the foundation for all the maps of the great west.

Since the publication of General Warren's map the knowledge of the geography of the Columbian Basin has increased, not so much by any new discoveries of magnitude as in accuracy and detail.

The land surveys under the Interior Department have added much to our knowledge of the settled portions, and the scouts, reconnaissances, and itineraries of officers of the Army have added much more to our knowledge of the settled portion and of the wild regions through which the Army is generally obliged to move in its conflicts and dealings with the Indians.

In the recently-published map of the Military Department of the Columbia, which embraces nearly all of the Columbian Basin lying within our Territory, compiled by me while on duty as chief engineer of the department, I have given all the topographical and economic information which I could obtain. It is founded on the most recent War Department map published by the Chief of Engineers; the Land Office maps and land surveys up to 1879 and '80, the Northern Pacific and other railroad surveys, the map of Lieut. Robert Fletcher, illustrating General Howard's Nez Percé campaign, numerous reconnaissances and itineraries of officers which had never been compiled, and information derived from conversations with officers and others familiar with portions of the country. To this was added the surveys made by myself and assistants in 1878-'79 and '80. These surveys extend over the country in Southern and Central Oregon east of the Cascades and lying along the Des Chutes and John Day rivers and Klamath, Summer, Abert and Warner Lakes; the Great Plain of the Columbia in Washington Territory and Idaho, especially the hitherto little-known regions of Moses Lake, Moses Coulée, and the Grand Coulée, the quadrilateral lying between the Snake, Salmon, Clearwater, and South Fork of the Clearwater in Idaho; Southwestern Oregon; and the regions of the Skagit and Sauk rivers in Washington Territory.

A great deal of knowledge is obtained each year from various sources, and it is hoped that an edition of the map, with all important changes, may be published every two years at least.

In compiling this map I could not help being struck with the great lack of information concerning certain portions of the country which it is intended to represent. There are large areas containing many hundreds of square miles which are comparatively unknown, and what little is known is of the most inaccurate and untrustworthy character, and that which is put upon the maps is largely hypothetical.

The regions to which I would particularly allude are the Olympic Mountain region; the region bounded on the north by the international boundary line, on the east by the Rocky Mountains, on the south by the Columbia and Wenatchee rivers, on the west by Puget Sound; the regions of the Saint Joseph and Clearwater rivers in Northern Idaho; and especially the regions of the Salmon, Weiser, and Payette rivers in Central Idaho.

There are thousands of square miles in these regions of which no accurate information has ever been obtained.. These regions may at any time become the theater of Indian wars in which a certain knowledge of the country would be of inestimable value and save the government, in money alone, more than it would cost to make a satisfactory survey of all the unknown portions.

Commercial enterprises are pushing their way into these regions, important transportation routes may pass through them, and all branches of the government as well as her private citizens and corporations will soon require a complete and thorough knowledge of the whole country.

I therefore call attention to these unknown and unsurveyed regions, and the need of money to carry on the necessary examinations and surveys therein, and to fix the geographical positions of a number of important and central points in the department by astronomical observations and computations.

CHAPTER IX.

THE GEOLOGICAL HISTORY OF THE CASCADE MOUNTAINS AND THE COLUMBIA RIVER.

In order to understand and fully comprehend the various features of this country, it is highly desirable and essential to know its geological history, its building up, and the changes which have taken place reducing it to its present condition. This is depicted with great distinctness upon its face and in its deep cañons, and is easily read by the student of nature.

If we turn back to the first pages of the geological history of this continent, we shall see that at the beginning of the Paleozoic era nearly all our present land was under water, not having yet emerged from the primeval seas. In the area of the United States two strips existed, forming the nuclei about which has been built the land as we now see it. One of these strips was the Appalachian Mountain chain; the other the Rocky Mountain chain. With the former we have nothing to do except to draw from it lessons applicable to the latter. By the Rocky Mountain chain is not meant simply a range of peaks, but a grand and wide belt of country in form of a gigantic fold, from which, in later times, the present ranges and peaks have been sculptured by erosion. All to the west of this chain, where now stand the Sierra Nevada, Cascade, and Coast ranges, was buried beneath the ocean. Many rivers existed then eating away at the western slopes of this great uplifted range, and depositing the débris along the shores of the pristine sea, forming thus sedimentary deposits of great depth and extent.

This deposition of sediment went on during the Paleozoic era, and the whole Triassic and Jurassic periods of the Mesozoic era until an enormously thick mass of off-shore deposits had accumulated.

This great marginal sea-bottom became the theater of intense aqueo-igneous action in its deeply-buried strata, producing a line of weakness which, yielding to the horizontal thrust produced by the secular contraction of the interior of the earth, was crushed together and swollen up into the Sierra Nevada and Cascade ranges at the end of the Jurassic period. The Cascade range thus produced was far from presenting any similarity to the range as we now see it. As far as can be ascertained, it was a range of not very great height, but probably higher to the south than to the north. This range existed for unknown centuries, and in its turn was the theater of erosion and of plant growth, and was roamed over by the wonderful extinct animals of the Cretaceous and Tertiary periods. It was not yet covered by the great lava flow and mountain range soon to be described, but instead by forests of conifers and oaks.

Where the Columbia River breaks through the Cascade Mountains there are found, beneath the overlying lava:

First. Along the water's edge, and for about fifteen feet upward, a very coarse conglomerate of rounded porphyritic pebbles and bowlders of all sizes up to five or six feet in diameter, cohering by an imperfectly lithified earthy paste.

Second. Above this conglomerate is a very distinct, irregular, old ground surface bed, in which are found silicified stumps, with their roots spreading out over twenty feet in diameter and penetrating into the bowlder material beneath and evidently *in situ*. This is undoubtedly an old forest ground surface.

Third. Resting directly on this ground surface, and therefore inclosing the erect stumps, is a layer of stratified sandstone, two or three feet thick, filled with beautiful impressions of leaves of several kinds of forest trees, possibly of the very trees about whose silicified bases they are found. This layer is not continuous, like the ground surface on which it rests.

Fourth. Above this stratified leaf-bearing layer, rests a coarse conglomerate similar to that beneath at the water-level. Scattered about in the lower part of this upper conglomerate and in the stratified sandstone, and sometimes lying in the dirt-bed beneath it, are fragments of trunks and branches of oaks and conifers, in a silicified or lignitized condition. They are evidently silicified drift-wood.

Fifth. Above this last conglomerate, *and resting upon it*, rise the layers of lava, mostly columnar basalt, one above another, to a height of more than 3,000 feet.*

All these facts were noted and studied by Professor Le Conte, who drew the following order of events from them.

First. The region of the Columbia River was a forest, probably a valley, overgrown by conifers and oaks. The subsoil of this forest was a coarse bowlder drift produced by erosion of some older rocks.

Second. By excess of water, either by floods or changes of level, the trees were killed, their leaves shed and buried in mud, and their trunks rotted to stumps.

Third. Tumultuous and rapid deposit of coarse drift containing driftwood, covered up the forest ground and the still remaining stumps, one hundred, perhaps several hundred, feet in thickness.

Fourth. The surface thus formed was eroded into hills and dales.

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*Professor J. Le Conte, in American Journal Science and Arts, 1874, Volume VII.

Fifth. Then followed the outburst of lava in successive flows, perhaps for a long period of time, and the silicification of the wood and the cementation of the drift by the percolation of the hot alkaline waters containing silica, as happens so commonly in sub-lava drifts.

Sixth. Finally followed the process of erosion, by which the present stream channels, whether main or tributary, have been cut to their enormous depth.

The great masses of sediment sent down to the sea from the primary Cascade range, forming a thick off-shore deposit, gave rise in its turn at the end of the Miocene to the upheaval of the Coast range, and, coincidently therewith, the Cascade Mountains were rent along the axis into enormous fissures from which outpoured the grand lava floods, building higher the mountains, and covering the country for great distances.

This is probably the grandest and most extraordinary lava flow which ever took place in the world, covering as it does an area of about 200,000 square miles of the Western States and Territories. Commencing in Middle California as separate streams, in Northern California it becomes a flood, completely mantling the smaller inequalities, and flowing around the greater inequalities. In Northern Oregon and Washington it becomes an absolutely universal flood, beneath which the whole original face of the country, with its hills and dales, mountains and valleys, lie buried several thousand feet. It covers the greater portion of Northern California and Northwestern Nevada, nearly the whole of Oregon, Washington, and Idaho, and runs far into British Columbia on the north. The average thickness of this tremendous flood is probably not far from 2,000 feet. This is shown where the Columbia, Des Chutes, Snake, Salmon, and other rivers cut through it. Its greatest thickness is not less than 3,700 feet, as demonstrated by Professor Le Conte.

To produce this enormous thickness many successive flows took place, and very long periods of time must have elapsed during which the volcanic actions were going on.

Along the Des Chutes, on the Snake River both above and below Lewiston, and on the Columbia below Rock Island Rapids, and in other places, the columnar basalt lies in horizontal layers, well-marked plains interrupting the continuity of the vertical columns. Magnificent examples of this structure are found in the basalts of the Cascade range. In the Grand Coulée the basaltic walls are from 300 to 600 feet in height, and between some of the layers there is a well-marked stratum of soil, evidently formed during a period between two successive flows of lava by the disintegration of the lava rock.

During this long period of the Cascade eruptions, the Coast range was being slowly elevated, and became, in its turn, the theater of local volcanic action. In all probability this local action was not very severe, except perhaps in the case of the Olympic Mountains and those in Northern California and Southern Oregon.

If the theory of the formation of mountain chains by the aqueo-igneous action taking place in deep deposits of sediment on marginal sea-bottoms is true, it is to be expected that at some time there will be another range elevated from the Pacific to the west of the Coast range; and if this latter follows the example of its prototype, the Cascades, it will give birth to lava floods overwhelming the Willamette and all other valleys lying between the two ranges.

The period of the great fissure eruptions in the Cascades drew to a close by the fissures becoming blocked up; the volcanic action was concentrated in some few localities, and the period of fissure eruptions was changed to a period of crater eruptions. These crater eruptions continued for a long period, in some cases even unto our own times, and to them we owe the upbuilding of those lofty snow-clad peaks which seem to us to have been forever locked in the embrace of eternal winter.

Commencing at the southern boundary of Oregon, the first of these peaks is Mount Pitt, which I ascended in 1878, and found it a beautiful cone-shaped structure, composed entirely of volcanic rock, flanked on all sides by numerous outlying spurs and foot-hill ranges. About its base are several small lakes, probably of glacier origin. This peak I found to be 9,818 feet above sea level.

Forty miles north of Mount Pitt stands Mount Scott, the next prominent peak of the range. Between these two peaks the range is somewhat low, with several well-defined peaks however, the highest of which is Union Peak, directly west of Fort Klamath, and which is 7,298 feet high. The beautiful level basin, lying at the head of Klamath Lake, in which is situated Fort Klamath, is 4,108 feet above the sea. Traveling along on the eastern slopes of the Cascades we found the soil to be composed of very light volcanic sand and ashes, interspersed with basaltic bowlders, and with here and there an exposed mass of rock resembling a trap dike.

Mount Scott, which we found to be 9,016 feet above the sea, has the same general features which characterize all the Cascade Mountains in the southern part of the range. It is of volcanic origin, and is covered on its eastern side with the ashes and light débris which have been carried over from the west, and which form a comparatively easy slope to the summit. On the west the bluffs are almost perpendicular walls of igneous rock, ragged and torn, among which nestle great masses of snow, sheltered from the summer sun, and forming reservoirs of water which irrigate beautiful patches of green in the lowlands at their feet. To the southwest, following down along these walls, our gaze at last rested upon one of the most remarkable and interesting features of nature's handiwork. In the calm stillness of an exquisite summer's day, lying in the dense and lonely wilderness, we saw *Mystic* or *Crater Lake*, a great elliptically shaped basin of water which we estimated to be five miles long and three miles wide, with unbroken cliff walls varying from 500 to 2,000 feet in altitude, crowned with pines and firs. A little conical island, like a cinder-cone, covered with scattering trees, is the only occupant of this weird lake. There is probably a subterraneous outlet of the lake in Sand Creek, which flows to the east, and is absorbed in the waters of Klamath Marsh. Mount Scott is undoubtedly a portion of the eastern rim of the ancient crater, the remainder to the west having been carried away by erosion, assisted probably by other causes. Crater Lake, with its conical island, occupies the center of the crater of this gigantic old volcano. The rim of the lake to the southwest has an altitude of 7,143 feet, and at this point the lake is about 500 feet below it.

It seems highly probable that along the eastern slope of the mountains, between Mounts Pitt and Scott, were formed the glaciers which, moving to the south, scooped out the Klamath Basin and the Klamath Lakes.

The portion of the mountain chain from Mount Scott on the south to Diamond Peak on the north was a region of numerous volcanoes and of very extensive local lava flows. It has a very high average elevation, and in it all the principal rivers of Western Oregon have their sources: the Willamette, running to the northwest; the Des Chutes running to the northeast; the headwaters of Klamath River, running to the south and breaking through the range and flowing to the west; the Rogue River, flowing to the southwest; and the Umpqua, to the west and north.

The great local outflow to the east forms the divide separating the headwaters of the Des Chutes from those of the Klamath system of waters, while the outflows to the west form the Calapooia Mountains, separating the Willamette from the Umpqua waters, and the mountains separating the Umpqua from the Rogue River waters.

Diamond Peak is 8,807 feet high, and is another typical high peak of the Cascade range. The peak itself gives evidence of being the southeast portion of an old crater rim, from four to seven miles in diameter, now very much broken away to the west and filled with a great mass of snow which has crevasses and partakes very largely of the nature of a glacier; I think it can truly be called a glacier on a small scale. About Diamond Peak are scattered here and there volcanic cones and little conical monticules, evidently parasitic volcanoes, and several fine lakes are seen from its summit, the largest of which is Odell Lake, the source of the main fork of the Des Chutes. This lake lies to the east of the peak, and is supplied by the melting of the great snow fields about the eastern portion of the Diamond Peak cluster. It is a very wild, romantically-beautiful sheet of water about five miles long and four wide. There is no grass on its borders, and the fallen timber, the bogs, and the dense thickets of brush and tamarack make it almost impossible for beasts of burden to reach its shores.

The main or west fork of the Des Chutes, issuing from Odell Lake, has cut for itself a deep and wide cañon among the eroded hills in which to flow. Following down this stream we came to where it opens out into a lake, surrounded by tree-covered cliffs, with bottom lands and meadows of considerable extent, and extensive mud flats near the lake. Following around its western shore we found that it had no visible outlet. There were water-marks twenty feet above us on the lava bluffs of the northern and northeastern shores of the lake, and during the night we heard rumblings among the sharply-cut rocks composing the bluffs. We found the next day that these lava beds formed an impassable barrier, extending unbroken for about four miles to the north, and at their end we found foaming out from beneath the great angular bowlders the clear cold water that we had seen lose itself in the lake fifteen miles or more to the south.

The lava rock composing this barrier to the waters is extremely hard and close-grained, in fact almost obsidian, and is broken into irregular blocks with very sharp, clear-cut edges. It seems to have come from some volcano to the south, between the east and west forks of the Des Chutes. Its recent origin is shown by the fact of its having dammed up the stream after the latter had cut for itself a deep and wide cañon bed, and also by its having such sharp edges and unworn, new appearance, and having no accumulation of soil of any kind on its top.

That there were volcanoes away to the east of the Cascade range there can be no doubt. Mr. Karl observed well-defined craters and local lava flows in the Pauline and Walker Mountains, which are composed largely of obsidian. It is highly probable, and I believe that in time it will be demonstrated, that there were many volcano and fissure eruptions in the desert country of Southern and Central Oregon, and also within the limits of the Great Plain of the Columbia.

The Three Sisters are the next marked peaks of the range. There are, in fact, five well-defined peaks, and it seems highly probable that they are all portions of a grand old crater-rim, twelve miles in diameter, now broken and worn away. Further examinations will be required to demonstrate whether this is so or not. Various small volcanic cones are in their vicinity and lying between them and Mount Jefferson.

Mount Jefferson follows next and then Mount Hood, both being true volcanic cones.

Persons who have visited Mount Hood say that near its summit there are places where hot sulphurous gases still escape, and there are very many who claim to have seen smoke in large quantities issuing from this mountain. To the north of Mount Hood the Columbia River has dug its way through the Cascades, forming for its use one of the most magnificent mountain cañons in the world, cutting through the entire thickness of 4,000 feet of the overlying lava and far into the previously formed conglomerate upon which it rests.

To the north of the Columbia the range widens out considerably into a region of high, grassy mountain plateaus, of deep cañons, heavily timbered slopes, and volcanic peaks. Among the latter, now dead and shrouded in snow, but once alive with the terrible force of the volcano, are the huge, stately masses of Adams, Saint Helens, and Ranier.

The period of volcanic eruptions is just over in these mountains, if it can be considered as yet entirely over. In a journal of a journey across the continent to Oregon in 1843, the author states that Mount Saint Helens burst into a burning volcano in 1843, and was still burning on the 16th of February, 1844, when he described it thus:

> The mountain burned most magnificently—dense masses of smoke rose up in immense columns, and wreathed the whole crest of the peak in somber and massive clouds, and in the evening its fire lit up the flaky mountain side with a flood of soft yet brilliant radiance.

The account is in a printed report in the Portland Library, but the name of the writer is not given.

Judge Thornton, writing of Mount Saint Helen's, says:

> It is an active volcano, near 46° 29′. It is 9,550 feet high. This mountain was in a state of eruption in the year 1831. The fact is affirmed by Dr. Gassner, a distinguished naturalist of England, who was in Oregon at the time, as also by gentlemen connected with the Hudson Bay Company. With the exception of a slight red, lurid appearance, the day was dark, and so completely was the light of the sun shut out by the smoke and falling ashes that candles were necessary. The weather was perfectly calm and without wind; and during several days after the eruption the fires, out of doors, burned with a bluish flame, as though the atmosphere was filled with sulphur.
>
> Credible persons in Oregon have informed me that they have on several occasions since seen the fire and smoke of this volcano.
>
> The Rev. Josiah L. Parish, who is connected with the Methodist Mission in Oregon, informed me that he witnessed on one occasion a most remarkable eruption of the mountain. I regret, however, that, not having noted his relation in my journal, the date of the eruption and the principal facts connected with it have been obliterated from my memory by events to which my attention has since been called. I only remember that no earthquake was felt, no noise was heard, and that he saw vast columns of lurid smoke and fire shoot up, which, after attaining to a certain elevation, spread out in a line parallel to the plane of the horizon, and presented the appearance of a vast table, supported by immense pillars of convolving flame and smoke.*

The Rev. Samuel Parker, after describing the eruption of Saint Helens in 1831, remarks that—

> The Indians say that they have seen fires in the chasms of Mount Hood. Tilki, the first chief of the La Dalles Indians, who is a man of more than ordinary talents, said he had frequently seen fires in the fissures of rock in the last-mentioned mountains.

It is possible, however, that all this smoke and lurid glare, &c., might have come from great wood fires which have swept over large sections of the heavily-timbered country about Saint Helens and Mount Ranier.

This mountain region is very rough, being deeply cut up with rugged and steep cañons. On the western slopes it is covered with magnificent forests, principally of fir, the trees growing to an immense size. One tree lying on the ground was measured by one of Commander Wilkes's parties, and found, at ten feet from its base, to be thirty-five feet in circumcumference and three hundred feet long. The general elevation of the plateaus is from 3,000 to 5,000 feet above the sea; they are untimbered and covered with good grass. General McClellan reported that upon these mountain plateaus there was a great extent of beautiful and rich pasture land and a delightful climate.

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*Oregon and California. Thornton, volume 1, page 256.

On the eastern slopes the forests are more open, and consist of pine, fir, and white cedar.

The Nachess Pass has an elevation of 4,900 feet above the sea, and in the upper part of its course the Nachess River flows through a very narrow cañon four hundred feet deep, the walls being of solid, compact volcanic rock.

There have been several very large local outflows of lava from this part of the main range. Several of these go to make up the eastward stretching ridges forming the Simcoe Mountains. One of these lava flows extended to the east just south of the forty-seventh parallel, crossing the Columbia River and forming Saddle Mountain, which extends to the eastward and is lost in the general surface of the Great Plain.

The base of this Saddle Mountain outflow has all been worn away by the Yakima and Nachess systems of waters, and by the glaciers which must have come down scooping out the valleys of these rivers. Where the Columbia cuts through the outflow, just north of Priest Rapids, the bluffs are close together and stand out very prominently, viewed both from the north and south. The name of the "Sentinel Bluffs" was bestowed upon them.

The Yakima Pass, in about latitude 47½°, crosses the mountains in a region of deeply-embosomed beautiful lakes, the high cliff-like banks of which are crowned with splendid forests of pine, fir, and white cedar. These lakes in all probability owe their existence to glaciers which in former ages swept down the valley of the Yakima.

To the north of this pass very little is known concerning the main chain of the Cascades. It is a region of high and rugged mountains, more jagged and rough than the regions to the south, heavily timbered, and with a number of lakes and deeply encañoned streams. There seems to have been a volcanic center between the Yakima and the Wenatchee and lying about midway between the lakes of the Upper Yakima and the Columbia, from which outpoured a grand flood of lava to the east and south, forming the elevated range between the Wenatchee and the Yakima, known as the Wenatchee Mountains, and crossing the present channel of the Columbia and forming Badger Mountain on the east.

To the north of the forty-eighth parallel, which is about the line of the Spokane and the westward flowing portion of the Columbia, the country changes, becoming more independent in its mountain formations, and joins on the east with the earlier rock materials of the western spurs of the Rocky Mountains. Near the mouth of the Spokane, and crossing that river in a direction northeast and southwest, there is a great vein of granular magnesian limestone. Granite is also found in this vicinity underlying the basalt.

About the mouth of the Colville River the rocks are very largely composed of limestone. The Columbia at the Little Dalles and Kettle Falls cuts through the limestone, which, to the west, seems to be covered up beneath hills of basaltic rock. This limestone is of good quality for building purposes and for lime.

There is a magnificent field for the geologist in the exploration of this region lying along the boundary line between the Cascades and the Rocky Mountains.

The natural consequence of the upbuilding of the Sierra Nevada and Cascade Mountains was the formation of a grand interior basin. The waters of this basin collected into secondary basins, some of very large extent, and were carried off by the rivers which have cut a way from the interior to the sea. The Columbia and its tributaries drained the northern portion of this great basin, and it was at this period, doubtless, that the Salt Lake of Utah assumed its old colossal proportions and found its outlet by the Snake River.

The commencement of the Tertiary period saw a great basin between the Rocky Mountains and the up-swollen primary range of the Cascades, especially in the region south of the Blue Mountains. This region was covered with fresh-water lakes and marshes, which were afterward overflown with lava. This lava has since become denuded in places, exposing the Tertiary beds, and furnishing evidence of the former condition of the region by the fossils found therein.

At the end of the Miocene the Coast range was upheaved, and the lava flows from the Cascade fissures commenced, but it was a long time before the lava flows reached the entire extent of the basins of Oregon, which continued to exist and be endowed with life away into the Pliocene period. The fossil beds of the John Day country and those near Christmas Lake in Southern Oregon are the principal ones that have been found in the country.

There is no evidence of which I am aware of any Tertiary basin north of the Blue Mountains. In the cañon of Snake River, a little below Lewiston, the basaltic layers, aggregating 2,000 feet thick, rest on granite. Above Lewiston, on the Snake, I found the same thing, as well as on the Upper Columbia near Lake Chelan, and the mouth of the Spokane.

It has been demonstrated to the satisfaction of geologists, and well stated by Professor Le Conte, that during the whole of the Tertiary period there was a gradual upheaval of the whole western half of the continent by which the axis, or lowest line of the great interior basin, was transferred more and more eastward to its present position, the Mississippi River. Probably, correlative with this upheaval of the western half of the continent, was the down-sinking of the mid-Pacific bottom, indicated by the coral reefs there existing. Also, as a consequence of the same upheaval, the erosive power of the rivers was greatly increased, and thus were formed those deep cañons in which they now flow. Thus the down-sinking of the mid-Pacific bottom, the upheaval of the Pacific side of the continent, and the down-cutting of the river channels into their wonderful cañons are closely connected with each other.

We may picture to ourselves that, at the end of the Tertiary and the commencement of the Quaternary, the hundreds of volcanoes of the Cascades were belching forth their fire and smoke and liquid rock; the sea entering and occupying the regions of Puget Sound, the Willamette Valley, and all the intervening country; the Coast range, with here and there a center of volcanic activity; and in the interior a vast sea of cooling, hardening lava, through which the rivers ran in extremely deep channels, some of them deeper far than they are now. Extremely heavy rains prevailed, wearing away the mountains and washing the débris down into the Willamette Valley and all the low areas near the coast.

During the Quaternary period the high-latitude earth oscillations, producing the Glacial, Champlain, and Terrace epochs, are very well illustrated in this northwestern country, and especially in the Upper Columbia River.

During the Glacial epoch, when the mountains were being chiseled out by the moving ice, glaciers, large and small, swept in different directions across the great plain of the Columbia, grinding away at the solid rocks, partially filling the coulées, and strewing the country for many miles with a thick bed of bowlders.

Probably the largest of these glaciers was one which formed in the region of Pend d'Oreille Lake, swept to the southwest across the Spokane Plains, receiving the Cœur d' Alêne glaciers, and on across Hangman's Creek, the Four Lakes country, and still on to the southwest, spreading itself out like a great fan, and grinding up the rocks and spreading bowlders over the Spokane plains, and the area south of Badger Mountain and Crab Creek, and rendering its aid in forming the ancient Columbian Lake, to be hereafter noticed.

The top surface of these Spokane plains is composed of small pebbles and some loose soil; underneath, for a depth of many feet, the material is of rounded bowlders from six inches to one foot and more in diameter, closely jammed together and the interstices filled with soil.

During the Champlain epoch following, this Spokane plain was covered with a great lake, leveling off the upper surface of this bowlder formation, filling up the cavities with earth, and spreading over the top the layers of pebbles and soil. To the north of the plain there are several well-defined terraces, indicating the different sizes of this lake, from the greatest to the final and least size, after which it was finally drained away in the succeeding Terrace epoch by the Spokane River cutting its way through the obstructing rocks, and forming its deep cañon below.

A study of the Yakima country shows the existence of a grand glacier fed by numerous branches about the heads of the Yakima and Nachess, and their tributaries, and moving to the south and east.

Undoubtedly, throughout the Cascade Mountains, and the mountains of the north, there were many glaciers of great size. Lake Chelan was surely scooped out by a giant glacier. The Okinakane Valley has terraces, and gravel and bowlder beds, similar to those of the Spokane. The lake enlargements of the northern rivers, the Okinakane and Osooyoos lakes of the Okinakane, the Arrow lakes of the Columbia, the Kootenay lakes of the Kootenay, the Kaniksu Lake of the Vermillion, the Flathead, Pend d'Oreille, and Cœur d'Alêne lakes, all are probably of glacier formation:

In the southwestern portion of the Great Plain, south of Badger Mountain and Crab Creek, surrounding Saddle Mountain, and embracing within its limits the lower portions of the Yakima, Walla-Walla, and Snake Rivers, and Moses Lake, there is a region lower than the surrounding country, and which was undoubtedly a lake during the Champlain epoch. It is largely covered with rounded bowlders of all sizes embedded in a loose, light, powdery soil, very difficult for animals to traverse. It is also a region of great sand hills and dunes. Moses Lake is formed by the waters of Crab Creek being dammed up by a great sand drift which has placed itself across the old drainage channel of the creek. In the northern portion of this old lake bed the bowlders and loose soil rest upon the volcanic rock, which, a little further north, is exposed, and has large areas without any earthy covering. Just north of Saddle Mountain the waters of Crab Creek have cut deep cañons through the powdery alkaline soil. The walls of these cañons and ravines show plainly by their stratification the sedimentary method by which the land was formed. I was not able to find fossils of any kind in this place.

To the south of Saddle Mountain the Columbia has cut through this lacustrine sediment, forming at the White Bluffs perpendicular cliffs along the left bank of the river fifty to three hundred feet in height.

Judging from the character of the sedimentary deposits, this old lake seems to have been the receptacle of all the volcanic ashes and cinders scattered over the country, and washed into it by the rains and streams.

Along the right bank of the river the accumulations have all been carried away, leaving a low flat plain. I have endeavored to outline this ancient lake as far as practicable, and propose for it the name of Lake Lewis, after Capt. Merriweather Lewis, the leader of the exploring party which first saw any of the headwaters of the Columbia.

The Champlain and Terrace epochs have left very marked evidences of their existence in the cañon of the Columbia, especially in that portion of it between the Colville and Spokane rivers and the Okinakane and Wenatchee rivers. In both these sections of the river there are terraces of all elevations from five to five hundred feet, aggregating a height of more than two thousand feet above the present river. I counted twenty-two of these terraces at one point in descending from the Great

Plain to the river opposite Lake Chelan. The river here flows at a depth of 2,500 feet below the level of the Great Plain.

About Lake Chelan and in the gorges and amphitheatre-like valleys of the mountains forming the right bank of the river these terrace plateaus are seen. About the mouth of the Spokane the terraces are extremely distinct and marked; Camp Spokane is situated on one of them 400 feet above the river. Along by Lake Chelan, and in many other places, the bed of the present river is composed of bowlders extending down to an unknown depth. All these facts go to show that previous to the Champlain epoch the cañon of the Columbia was cut to its present depth, and in some places far below it; that during the downward oscillation of the Champlain epoch this cañon was filled up by débris, bowlders, &c., to a height of 2,000 feet above the present river surface; and that at this time there was a great lake in the southwestern part of the Great Plain of the Columbia. During this epoch also the Grand Coulée was occupied as a secondary channel by the Columbia, and the deeply cut cañons of Moses Coulée, Wilson Creek, Kenewaw Run, Marlin Hollow, Lake Creek. Crab Creek, &c., were occupied by large streams pouring their waters into the great Columbian Lake.

When the downward movement of the Champlain epoch came to a close, and the upward movement of the Terrace epoch commenced, then the Columbia began to cut its way down through its old elevated bed of bowlders and drift with which its previously-formed cañon was filled, and the waters began to drain away from the Columbian Lake. The Columbia Cañon being very narrow, the terraces only remained where they were protected from erosion by the jutting cliffs of rocks forming recesses. This must account for their lack of continuity.

To the west of the Cascade Mountains, in Washington Territory, there are beautiful illustrations of these post-tertiary high-latitude oscillations in the numerous inlets, passages, canals, and straits making up Puget Sound. These complicated channels are without doubt the work of glacial erosion at a period of greater elevation than the present. Subsidence filled them with water from the sea, which also spread over the land far to the south. Numerous gravelly prairies between the Columbia and Puget Sound, and the Suoqualmie, Steilaguamish, and other flats, attest the presence of a much more extended sound than now exists. A partial re-elevation has brought the sound to its present beautiful and interesting proportions.

Looking at the map of the Columbian Basin, and having a personal knowledge of the country, the question naturally arises, why did the waters choose their present courses, and how were the tremendous cañons through which they flow formed? The basaltic rock composing these cañons is extremely hard in some places; notably in the cañons of Snake River near the Salmon River it is almost as hard and compact as solid flint or obsidian. The rocks between high and low water have a polished vitrified appearance, and it seems to me that for water to wear through this Snake River Cañon of more than 3,000 feet of extremely hard rock for 200 miles in length would take an inconceivable length of time. The same may be said of the cañon of the Upper Columbia, the cañon of the Des Chutes, of the Salmon, and the tremendous gorge where the Columbia cuts through the Cascades.

It would seem that these cañons were not commenced until after the last of the lava flows making up the aggregate thickness of the lava over the country, for these lava flows show continuity and horizontality from one side of the cañons to the other. Of course, if a channel was once formed, any subsequent flow would fill it up with lava and force the water to commence its work all over again.

Certain appearances and studies of the Coulées of the Great Plain would indicate that they are of fissure formation. Moses Coulée, with walls from two hundred to four hundred feet high, heads abruptly in the Great Plain, forming a complete and perfect cul-de-sac. This seems incompatible with its being entirely a channel of erosion.

In the Grand Coulée, the Steamboat Rock, and the formations about the middle pass of the Coulée, are indicative to me of its being a great fissure. And so of the other coulées and cañons, now either dry or containing small streams, which do not seem to have ever been of sufficient size to cut the cañons inclosing them.

I must subscribe myself to the belief that the courses of many of the most deeply encañoned rivers of this country were determined to a very great extent by their waters finding and collecting in great fissures, and that these fissures were formed during the late Tertiary or during the upward oscillation of the Glacial epoch.

CHAPTER X.

THE GREAT PLAIN OF THE COLUMBIA.

The northern portion of the interior Columbia Basin, known as the Great Plain of the Columbia, may be described as that area bounded on the west by the Cascade Mountains, on the south by the Blue Mountains, on the east by the Bitter Root and Cœur d'Alêne Mountains, and on the north by the mountains of the Moses and Colville Indian reservations, and those in the triangular area between the Columbia and Clarke's Fork. This area is about 145 by 155 miles in extent, and contains approximately 22,000 square miles, or 14,080,000 acres, an area twice the size of Maryland, and as large as Massachusetts, New Hampshire, Connecticut, and Rhode Island together. This section is also known in popular parlance as the "Bunch-Grass Country," from the fact that nearly all the plains and hills throughout its extent are covered with this most hardy and nutritious grass.

In the spring and early summer when it is green and juicy it is very sweet and palatable, and cattle eat it with avidity. During the summer it ripens, and the heat of the sun and dearth of moisture dry it up and color it a rich yellow brown; but in this condition it is even better for stock than it was in its early green state. I have been told by an old pioneer packer, who for many years packed through the country, that his animals would keep in better condition on bunch-grass alone than they would if fed on ordinary hay and grain. "Bunch-grass" has become the synonym for things good, strong, rich, and great: the bunch-grass country is the best and finest country on earth; bunch-grass cattle and horses are the sweetest, fleetest, and strongest in the world; and a bunch-grass man is the most superb being in the universe.

Over nearly the whole of this Great Plain of the Columbia there is now spread a rich and fertile soil, varying in depth from a few inches to hundreds of feet. This soil has been produced by the grinding action of the ice and drift of the Glacial epoch, by the water-wearing of the Champlain epoch, and from the disintegration of the rocks during the last and present existing Terrace epoch; by the action of summer's rain and heat, winter's frost and cold, and the chemical decomposition arising from exposure to the atmosphere.

The eastern portion of this plain has a much greater thickness of soil than the western, and this is owing undoubtedly to the greater amount of moisture in the atmosphere, and to the soil brought down by its streams from the mountains on the east and south. Soil arising from the disintegration of volcanic rocks is known to possess in a high degree the qualities and mineral constituents needed by plants. The most fertile soils of France, Italy, the Sandwich Islands, and California are of this nature, and the wondrous harvests in some localities in the *bunch-grass country* show that its soil has no superior anywhere.

Early travelers over these sections formed and recorded various opinions concerning the quality of the lands. They were influenced in their views by the season of the year in which they traveled.

To one now who travels over an uncultivated portion of the country in the spring and early summer nothing can be more promising than its appearance around him on every side. The valleys and rolling hills stretch away covered with a luxuriant growth of green and tender grass, and the varied hues of the multitudinous flowers add color and great beauty to the scene. The soil is moist, showers of rain fall frequently, and little streams and trickling springs are seen in all directions. After awhile comes a change; the showers cease, the clouds disappear, and nothing interposes between the burning rays of the sun and the parching earth. The grass loses its cool, green hue, the flowering plants become shrunken and withered, the springs and rivulets become small or extinct, and the soil dry and dusty. During this latter period of the summer and fall the traveler would form a very poor opinion of the land, and declare that it was not capable of raising the crops required by man. He would give it credit for being a good grazing country when water could be procured, but that is as far as his recommendation would go. This is precisely the reputation that this country has had for many years. Within a short time, however, farmers have demonstrated that the high and dry hill land is better for crop-raising than the colder and more organic soil of the valleys, and experiment and demonstration have marched along together until it is proven that over nearly the whole of this Great Plain of the Columbia the cereals—wheat, barley, oats, flax, &c.—grow and return abundant harvests.

An increase of moisture seems to come with an increase of cultivation, and every acre that is planted, tended, and harvested, adds to the total agricultural acreage of the country and its capability of grain-producing. This has been abundantly proven in Nebraska and other sections east of the Rocky Mountains. After Fort Kearney was established in 1848, the government employed a skilled farmer for years to live there and try to raise vegetables for the troops and grain for the public animals. But agriculture was a complete failure owing to lack of rain. Now all about the old fort are thousands of farms on all of which abundant crops are raised. This change has been produced by the westward progress of settlements, carrying along an increased rainfall.

In some localities on the Great Plain it is still a question whether the land will produce or not, as no experiments have been made. It is a fact that it takes about three years to test the soil thoroughly in any portion of this country. The first year the crops of grain are light, as the bunch-grass is not rotted, and tends to choke out its civilized rival. The second year the same thing takes place, but to a less extent. The third year, however, the grass has been pretty well killed and the sod rotted, and the soil properly comminuted and prepared for its work, and this year's yield will generally tell its value.

It would be policy for the great railroad companies, owning immense bodies of land in the country, to make these tests in different localities, and by this means prove to the inquiring settler what quality of land it is which is offered to him. In a great many cases, undoubtedly, intending settlers are forced away by the uncertainty as to the producing power of the soil and the lack of time and means to test it.

The two great drawbacks to the rapid settlement and growth of the country are the lack of an abundant supply of water and lack of wood for fuel and lumber. In regard to it as a grazing country, it may be said that there is grass in the greatest abundance for thousands and tens of thousands of cattle and horses, which cannot be eaten off owing to the lack of water. But in this same country in all probability a sufficiency of water can be had, either from natural sources or by digging, to supply the needs of the people and animals engaged in cultivating the soil.

The volcanic rock underlying the country is, I believe, well adapted to the storage of water falling upon it and percolating through its small fissures and interstices to the greater fissures and cracks below. In nearly every place where it has been tried, water has been procured by digging.

SAGE-BRUSH LANDS.

Sage-brush has become almost a synonym for worthlessness, and to say that a piece of land is sage-brush land condemns it at once in the minds of many people. But this is not right; for while a great deal, probably the greater portion, of the sage-brush land of the country is poor and comparatively worthless, there are large tracts covered with sage-brush which are of the finest quality. The little, short, stunted sage-brush, such as grows about the mouth of Snake River and the Central Oregon deserts, is indicative of very poor, unproductive soil. But far different is the case when the sage-brush is thick and strong, standing from four to twelve feet high, as it does in the vicinity of Honey Lake, Surprise Valley, and many other places in California and Nevada, and in portions of the Grand Coulée and Badger Mountain country. This kind of sage-brush has been found by experience to grow only in the richest soil, which, when brought under cultivation, produces the greatest harvests. When I visited Honey Lake Valley, a few years ago, the people had already adopted the expression that the bigger the sage brush the better the land.

Sage-brush is very hard to eradicate, from the fact that no matter how thick it stands fire will not run in it. Its most fatal enemy, strange to say, is grass. I have been informed by old settlers about The Dalles and other places that large areas which are now covered with bunch-grass were, when they first came into the country, covered with sage-brush. They described the method by which the bunch-grass overcomes and replaces the sage-brush, and which subsequent observation of my own induces me to believe. This is as follows: If we have two contiguous areas covered, one with bunch-grass and the other with sage-brush, the grass grows in among the brush for considerable distances, enveloping the roots and lower portions of the brush. At some time fire comes and sweeps over the grass, burning it to the ground. This fire does not injure the grass-roots, which spring up again as green and hardy as before. Not so the sage-brush; the fire has killed it, and in a short time the old stalks and roots rot away and the bunch-grass completely usurps its place; and so the struggle goes on until the whole area is covered with grass.

In order to show the extraordinary fertility of this region of the Columbia River I give below the statistics from the United States Census office of the average yield, per acre, of the cereals grown in 1879 in the State of Oregon and Territories of Washington, Idaho, and Montana, comprising those regions drained largely by the Columbia River and its tributaries. Montana is included in this region for the reason that, while most of the Territory is drained by the Missouri, a large proportion of the cultivated land is on the headwater streams of the Columbia, in the Missoula Basin.

Cereals of the United States; average yield per crop of 1879.

States.	Barley.	Buck-wheat.	Indian corn.	Oats.	Rye.	Wheat.
Oregon	31	17	22	29	16	17
Washington	39	24	19	41	14	24
Idaho	33	....	29	35	12	24
Montana	30	13	29	36	29	27
Average for whole region; mean for above	33	18	25	35	18	23
Average whole United States	22	14	28	25	11	13

From this it is seen that the average yield of barley per acre in this Columbia country is 50 per cent. greater than the average yield in the whole United States, including this region; the average yield of buckwheat is 29 per cent. greater; the average yield of Indian corn is 11 per cent. less; the average yield of oats is 40 per cent. greater; of rye, is 64 per cent. greater, and the average yield of the most important cereal of all, wheat, is 77 per cent. greater than the average of the United States.

I give below the average yield of the cereals per acre of the cereal crops of 1879 for the principal agricultural States of the Union, and those whose averages are the largest.

States.	Barley.	Buck-wheat.	Indian corn.	Oats.	Rye.	Wheat.
Arkansas	12	6	19	13	7	6
California	21	22	28	27	9	16
Dakota	17	8	22	28	10	11
Illinois	22	11	36	32	16	16
Indiana	23	10	31	25	12	18
Iowa	20	10	42	34	15	10
Kansas	13	10	31	19	12	9
Kentucky	24	10	24	11	7	10
Massachusetts	25	12	34	31	10	16
Michigan	22	12	35	34	13	19
Minnesota	26	11	34	38	16	11
Missouri	19	11	36	21	12	12
Nebraska	15	11	40	26	12	9
New York	22	15	33	30	11	16
North Carolina	11	8	12	8	5	5
Ohio	30	13	34	31	13	18
Pennsylvania	19	15	33	27	9	13
Texas	13	11	12	21	8	7
Virginia	17	8	16	9	7	9
Wisconsin	25	9	34	34	14	13

The statistics regarding the production of Irish potatoes in the States and Territories where they are principally raised is given in the following table

States.	Acres.	Bushels.	Yield per acre.
Washington	6,823	1,035,177	152
Oregon	11,106	1,359,930	122
California	55,471	4,550,563	82
Connecticut	32,375	2,584,262	80
Illinois	151,126	10,365,707	69
Indiana	91,985	6,232,246	68
Iowa	121,358	9,962,537	82
Maine	71,416	7,999,625	112
Massachusetts	32,660	3,070,380	94
Michigan	134,274	10,923,000	81
Minnesota	51,419	5,184,676	101
Nebraska	28,347	2,150,873	76
New Hampshire	29,650	3,358,828	113
New Jersey	41,683	3,563,793	85
New York	340,903	33,612,813	96
Ohio	173,321	12,719,215	73
Pennsylvania	185,429	16,284,819	88
Rhode Island	5,988	606,793	101
Vermont	38,855	4,438,172	114
Wisconsin	99,266	8,509,161	86
Dakota	6,900	654,036	95

These statistics are only given to show the great fertility of the soil in this country drained by the Columbia, its adaptability to support a large population engaged in agricultural pursuits, and the enormous crops which its immense acreage must yield as soon as a population sufficient for their cultivation is attained and means of transportation provided. This country is far away from the seat of government and is very little known, but it is bound soon to force itself on the attention of the country as one of the grandest portions of our domain, unexcelled by any in the productions of the earth, in the beauty, extent, and yield of its waters, in its mountains clothed with splendid forests and enfolding mines of the useful and precious metals, and in its climate.

In consequence of its great and sure promise our legislators should look upon it with liberal eyes and grant abundant aid to all desirable works of public improvement which may be undertaken to facilitate transportation, sure of a prompt and rich return in the increased prosperity and loyalty of the people.

From the interior water-ways, the Columbia and Snake Rivers, should be removed, as far as practicable, all the rocky fetters which prevent and hinder full and free navigation. Commerce will require it, the people will demand it, and it must be done sooner or later.

In order to particularize a little in regard to this great plain of the Columbia, let us suppose that portion north of the Snake and Clearwater to be divided into four nearly equal parts by a line drawn due south from the Big Bend of the Columbia, near Camp Spokane, to Snake River, and a due east and west line through the southern end of Big or Colville Lake.

The northeastern portion may be designated as the *Spokane* section; the southeastern as the *Palouse* section; the northwestern as the *Crab Creek* and *Grand Coulée* section, and the southwestern as the *Moses Lake* or *Desert* section. To these must be added the section south and west of the Snake or the *Walla Walla* section; the one south of the Clearwater and east of the Snake, or the *Lewiston* and *Mount Idaho* section; and the one to the west of the Columbia, or the *Yakima* section.

THE PALOUSE SECTION.

The lands of this section are nearly all of good quality, and are being rapidly settled. The section is well watered, the main streams being the Palouse, Cow Creek, Rock Creek, Pine Creek, Union Flat Creek, Rebel Flat Creek, Potlatch Creek, and the head waters of Lahtoo or Hangman's Creek. These streams all flow through deep cañons with narrow valleys or through deep depressions bounded by rolling hills. Besides these there are numberless smaller streams.

Considerable *scab land* exists in the western and northwestern parts of this section. The land so designated by the people of the country is that where the original volcanic rock is exposed and uncovered by any soil. Patches of this exposed rock exist scattered through the most fertile regions. This is the most fertile, most thickly settled, and best known of the four sections north of the Snake. Several fine towns have been started in this country; the principal one, and the one which is destined to become quite a railroad and commercial center, is *Colfax*, at the junction of the north and south forks of the Palouse. Probably not more than one-tenth of the land in this section is taken up and occupied.

The western portion is devoid of timber, but in the eastern portion about the headwater streams of the Palouse and Hangman's Creek, plenty of fine timber exists.

One of the most singular and prominent features of this section is Steptoe Butte, a perfect cone, elevated about 2,000 feet above the surrounding country, standing quite alone, isolated from any neighboring peak or range.

Another singular feature of this section is the fact that a number of the streams run in a direction parallel with the Snake. Union Flat Creek heads about six or eight miles from the Snake River, to the northeast of Lewiston, and then takes a northwesterly course, and for seventy miles, until it flows into the Palouse, keeps at about the same distance from the river. Rebel Flat Creek, Willow Creek, and the main forks of the Palouse all follow the same general direction, making to a great extent the same bends. It is probable that glaciers moving in this general direction must be assigned as the causes of this parallelism.

The falls of the Palouse form another of the interesting objects of this section. In the lower portion of its course the Palouse flows through a deep fissure in the basaltic rock, portions of which take fantastic forms, as towering pinnacles, &c. At the falls the river descends perpendicularly for about 120 feet into a narrow basin, from which it flows off through its deep cañon for about nine miles to the Snake River. The salmon ascend only to the falls; and the Palouse Indians have a legend which tells of the wickedness of the Indians higher up the country, and how the *Great Spirit* in his displeasure placed the falls as a barrier to the further ascent of the salmon.*

THE SPOKANE SECTION.

This section is more varied than any of the others. In its southeastern part is Cœur d'Alêne Lake and the fine timber-covered country surrounding it. In its northeastern and eastern part are the gravelly Spokane Plains and the fertile prairies embedded in the northern woods. Its western portion comprises some of the finest farming lands in the Territory, among which are those known as the Deep Creek, Four Lakes, Upper Crab Creek, Hawk Creek, and Cottonwood Spring Counties, Gordon Prairie, &c. The Spokane River runs through this section, giving water transportation for the timber from the great forests about its headwaters, and furnishing one of the finest water-powers in the world. The main line of the Northern Pacific Railroad runs diagonally through the section. Along the Spokane River, below the falls and upon its small tributaries, there is a good deal of timber, which will furnish the inhabitants and settlers with wood and lumber for a number of years, until more railroads are built and the commerce in grain, fuel, and lumber becomes established.

Due west from Spokane Falls and extending in a westerly direction is the divide, between the streams which flow north into the Spokane and south into Crab Creek. This divide is no higher in appearance than the country to the north and south; it abounds in springs and swales, where the waters collect and then flow away as rivulets and brooks through the gently-rolling hills at first, finally becoming more deeply encañoned as they near their destination at the greater river or creek. Of course those flowing north into the Spokane cut more deeply than those flowing south. This divide is of importance in the economy of the country, as it furnishes an excellent route for a railroad, which will pass through an extremely fertile and desirable country, and be easily accessible from both sides throughout its entire length. This railroad is one which in the near future must certainly be built. Its starting-point must be at the falls of the Spokane, from where it will stretch away westward to the Okinakane and vicinity of the Wenatchee, bearing in one direction its loads of grain to be ground into flour for shipment to the great world, and in the other direction the fuel, lumber, and merchandise required by the inhabitants of the country through which it passes.

Among the singular features of this country are the Spokane Plains. Lying along the banks of the Upper Spokane, and extending off towards

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* Stanley.

Pend d'Oreille Lake, there is a system of nearly level plains rising one above the other into terraces towards the north. These plains are composed chiefly of gravel and bowlders, and the vegetation on them is slight, and they are not well adapted to farming purposes. The higher terraces seem to be much better than the lower ones, as there is more good rich soil intermixed with the gravel on them.

It would be a mistake, however, to suppose that these plains are valueless. They are well adapted to grazing purposes, and throughout there are large patches and strips where the rich soil has collected in sufficient quantity and depth to give most excellent farming lands. Some of the garden farms on these fertile patches are already famous for the quality and quantity of their products.

Upon this gravel plain, just above where Hangman's Creek joins the Spokane, is situated the city of Spokane Falls, and it certainly is unexcelled in the whole world as a town site. There will never be any mud, and pavements will never be needed in this beautiful place, which is already assuming the dignity and business appearance as well as the name of a city. The Northern Pacific Railroad here crosses Hangman's Creek, and first reaches the Spokane River; several other railroads have been projected which, when built, will make the town an important railroad center. Its situation and natural advantages must make it a place of consequence, and great things are predicted of it.

The climate is truly delightful and of the most undoubted healthfulness. In the vicinity are all the elements which go to make up an attractive place of residence; beautiful scenery of varying plain and mountain, prairies, and timbered hills, lovely lakes for boating, fishing bathing, &c.; a picturesque river abounding in the finest trout; unexcelled rides and drives, and hunting of all kinds, from prairie shooting to deer, elk, and bear hunting among the summits and gorges of the mountains.

Cœur d'Alêne Lake is an extremely beautiful sheet of clear water, well stocked with the finest trout and surrounded by beautifully formed, timber-covered mountains. Its main feeders are the Cœur d'Alêne and Saint Joseph rivers, flowing from the Bitter Root Mountains. On the banks of these streams and in their vicinity there are splendid bodies of timber, which at some time must become very valuable. These rivers are not now in a good condition to run logs on, being blocked up with fallen timber, which will have to be cleared out before they can be used. Once cleared out during high water, logs can be taken down without limit or trouble. The lake lies at the same general level as the lower Spokane Plain, and is an old eroded basin formed at a period of greater elevation than the present. About eight miles down the Spokane River from the lake there is a very great contraction of the river at the Little Falls. This has had the effect of slowing up the waters between it and the mouth of the lake, and depositing a large amount of gravel, pebbles, and bowlders, thus damming back the waters into this eroded basin and forming the lake. Little bottom land lies along the lake, and the banks are generally steep and high.

In the Four Lake country there are three small lakes, whose waters are strongly impregnated with the carbonate of soda, and which have been dubbed the Medical Lakes. The water has a very soapy feel and effect, and is delightful to bathe in. The effects of a strong and continued wind storm on the lakes is very curious; the water is lashed into a soapy foam very white and light, which collects on the banks to a depth, at times, of several feet.

THE CRAB CREEK AND GRAND COULÉE SECTIONS.

This is a portion of the country which is and has been very little known. Its remoteness has deterred settlers from going to it. Before I first went into the section, in 1879, I could obtain very little information in regard to it. Then, all the inhabitants were three or four cattle-raisers living along Crab Creek—" Portugee Joe," living on Kenewaw Run, and " Wild Goose Bill," on the headwaters of Wilson Creek.

The establishment in 1879 and abandonment in 1880 of the military post of Camp Chelan, caused many people, in the capacity of teamsters and other government employés, as well as the military, to go over the country, and a knowledge of it has been thus acquired and disseminated, and now there are quite a number of settlers who have gone into the country to make themselves homes. Of course it cannot become much of an agricultural country until a market for its products is afforded by the construction of a railroad into it. This section has never seemed to enter into the minds of people except as a broken and almost desert land, but I speak from a knowledge acquired by traveling over nearly the whole of it, and I shall not hesitate to characterize it as a very fine agricultural and grazing section. The country between Crab Creek and the Columbia is well watered by streams heading along the divide already mentioned, which lies quite near the Columbia; these streams flow with more or less water, according to the season of the year, through valleys of varying width, in a southwesterly direction, to Crab Creek. The land about the heads of these creeks and that lying between the creeks along their lower course is of the finest quality, growing the most luxuriant bunch-grass and giving every evidence of being a magnificent grain country.

In 1880 I laid out a wagon-road from Ritzville, on the Northern Pacific Railroad to Camp Chelan, a distance of one hundred and seven miles. Over nearly the whole of this distance I found the bunch-grass growing strongly and well, and the soil of undoubted fertility. The rolling hills to the south of Crab Creek for a distance of from five to twenty miles are of the same exellent quality as those to the north. Of course there is some poor land in the area east of the Grand Coulée, but as a whole it is scarcely to be surpassed.

The Grand Coulée is the most singular, prominent, and noted feature of this portion of the country. It commences on the Columbia between the mouths of the Sans Poil and Nespilem rivers and extends in a southwesterly direction for fifty-five miles, when it merges into the bowlder-covered, prehistoric Columbian Lake mentioned in the geological chapter of this report. Except at one point it is a deep chasm, with vertical, impassable walls, averaging about 350 feet in height. About midway between its extremities these walls are broken down, entirely so on the east, and so much so on the west that a wagon has no difficulty in ascending. The coulée here is partially filled up by the broken-down hills. The cause of this break seems to have been a flood of water or ice coming in from the northeast and flowing off down through the coulée chasm. Many rounded bowlders are here found in the soil, and great rocks of large size, which could only have been transported by the agency of ice. To the north of this middle pass the bottom is quite level; it has some springs and small ponds, and can be traveled without difficulty. It is in some places nearly four miles wide. The southern portion is very narrow, and the bottom is filled with a succession of lakes, the northern ones being of clear, white, sweet water filled with fish; toward the south the lakes become more and more strongly impregnated with alkali, until the one at the end of the coulée is of the most detestable unpalatable nature. At its junction with the Columbia the coulée is crossed by a very bad wagon-road, and a trail crosses it about seven miles from the Columbia. The only other place where it can be crossed is at the Middle Pass mentioned above.

I first called attention to this Middle Pass in 1879, and located a wagon-road across it in 1880. It is the only place where, by any means, the coulée can be crossed by a railroad from the Columbia to its end near Moses Lake. The southern portion of the coulée from this point cannot be crossed or traversed owing to the lakes and steep walls.

To the west of the Grand Coulée there is another running nearly parallel with it, known as Moses or Little Coulée. This has a number of springs and much good land in it. The land between the two coulées is mostly rich and covered with bunch grass. This Moses Coulée comes to an abrupt end, inclosing a little lake.

Foster Creek, with its many branches and fertile soil, lies to the north. Many springs and little lakes exist throughout this portion of the section under discussion. There is every inducement in the way of natural advantages for thousands of settlers in this portion of the country.

West of Moses Coulée there is a condsiderable area of timber land, and the vegetation indicates a rich soil, but water is not plentiful. It may be obtained by digging, but this has not been tried, and hence is uncertain.

In the southwestern portion of this section lies Badger Mountain. This could only be called a mountain in a country as flat as the Great Plain, and does not deserve the name. It is a long, rolling divide, whose sides are cut by gullies, in many of which springs are to be found. The soil of this mountain appears to be exceedingly rich, and, indeed, if I was asked to name the richest, most fertile area in this whole Columbia Basin, I know of none that I would name before Badger Mountain. The vegetation is indicative of its fertility, being, besides bunch-grass, rose bushes, choke-cherry bushes, haws, willows, &c., all growing thick and strong. The country is well watered, and will, in time, have an easy outlet by the Columbia River, and deserves the attention of everybody having the great transportation and other interests of the country in hand.

Throughout this section the Great Plain lies about 2,000 to 2,500 feet above the river level, and it is extremely difficult to get from one to the other. West of the Grand Coulée, the only practicable railroad route to the Columbia, that I am sure of, is by way of Foster Creek.

By this route an excellent grade can be made to the river. It is possible that by the way of Moses Coulée, or the southern side of Badger Mountain, an easy way to the river may be discovered.

The commercial center of this section will probably be somewhere in the vicinity of the Middle Pass of the Grand Coulée. Another and greater center will, in the future, be located near the mouth of the Okinakane.

THE MOSES LAKE OR DESERT SECTION.

This last one of the four sections which I have been considering, can be dismissed with a few words, and those almost entirely of condemnation. It is a desert, pure and simple, an almost waterless, lifeless desert. A few cattle exist along the Columbia, where they can reach the river for water, and some more along the lower Crab Creek below Moses Lake. This section is much lower than the remainder of the Great Plain, and evidently was a lake for hundreds of years, forming deposits several hundred feet in thickness, and which are plainly shown at the White Bluffs and Crab Creek Coulée.

A large portion is covered with bowlders embedded in a loose, light, ashy soil; other portions are covered with drifting sands, and, taken all in all, it is a desolation where even the most hopeful can find nothing in its future prospects to cheer.

Crab Creek sinks soon after receiving the waters of Wilson Creek, and rises just above Moses Lake, of which it is the only feeder. At this point the water is passably good to drink. Moses Lake is stagnant, alkaline, and unfit for any use. At its lower end are great sand dunes and sandy wastes.

The water seeps through this sand and rises again a few miles to the south and flows southwesterly to Saddle Mountain, where it is turned to the west, sinking and rising several times. I do not think that it now ever reaches the Columbia. Below Moses Lake the creek water is alkaline, filled with organic matter, and unpalatable.

The following account of a journey across the two western sections of the Great Plain is from my report to the Chief of Engineers in 1880:

In August, 1879, I left Walla Walla and proceeded to Wallula, and thence up the Columbia to the White Bluffs. At the head of the long island, we left the river to look out for a practicable route for a wagon-road to the military camp, then in the vicinity of the mouth of the Okinakane, on the supposition that it was to be permanently located there.

We reached the top of the bluffs, which are here about 540 feet high, by going up through a long gulch greatly beaten by cattle. The soil is dry and is ground to powder by the feet of the cattle wherever they make a path, and is not well suited for a road. We however found, a short distance down the river, a gulch, up which the ascent to the top of the bluffs is easy and gradual.

From the summit the country spreads out, gently rolling, as far as the eye could reach, to the northeast and east. To the north and northwest a small mountain chain, devoid of timber, stretched itself from east to west across our way. It is called Saddle Mountain. The country was covered with a luxuriant growth of bunch-grass, with here and there a tract of sage-brush. The soil is of firm and excellent quality. Quite a large number of cattle were seen, all of which had to descend to the river for water.

Proceeding somewhat to the northeast, to skirt Saddle Mountain, we soon found ourselves getting into a country more sandy and more rolling, and our mules and horses had greater difficulty in getting along. In the afternoon, being on the lookout for water, we made for a green-looking spot off to the east, hoping it was a spring. In this we were disappointed, and we continued on our way until nine o'clock at night, when, not finding any water, we unloaded and made ourselves as comfortable as possible without it. The next morning before daylight we took up our laborsome march through the sands of the desert and traveled until about two in the afternoon, when, as our animals were suffering intensely from thirst, and as we were uncertain about what lay before us directly north, we concluded to strike to the westward, as from all the indications it was more likely to give us a supply of water. About three o'clock we came to an old road, which gave indications of having at one time been well traveled, and we turned and followed it to the northward, trusting that it would take us to water.

At five o'clock our animals seemed utterly unable to carry their packs any further, and so we unloaded them and piled up our baggage and kept on without it. About nine o'clock that night we came to a small alkali pond, which, vile as it was, seemed like nectar to us and to our poor horses and mules.

The country we had traveled was covered partly with sage-brush, bunch-grass, and weeds, and was utterly waterless and lifeless. Not even the cheerful coyote lived there, for not one lulled us to sleep or molested our abandoned provisions and camp equipage. The next day we found the fine spring which feeds the alkali pond above mentioned. I afterwards learned that it goes by the name of Black Rock Spring. Here the face of the country changes to a certain extent and becomes more broken up.

Black Rock Spring is at the head of a coulée which extends off to the southwest, and probably as far as Moses Lake. From Black Rock Spring we kept to the north, and in about nine miles came to Crab Creek, which is here quite a stream, flowing through a rich bottom half a mile wide. Up the stream the bottom narrows and becomes a chasm, formed by the perpendicular and overhanging walls of basaltic rock. Lower down the bottom became a marsh, entirely filling the space between the basaltic walls, in which the creek sinks to collect again further below. Where we crossed it the bottom was good, and the descent and ascent from the great table land were comparatively easy. A goodly number of fine fat cattle inhabited this valley and the adjoining high grounds, and no doubt fine gardens could be made and nearly every garden vegetable raised.

Leaving Crab Creek we went nearly northward, taking as a guide the Pilot Rock, a mass of rock about thirty feet high, but which, on account of the general flatness of the country, can be seen for a great distance in every direction. Soon we crossed Kenewaw Run, the dry bed of a winter stream, now containing a scanty supply of water in lakes and springs. Leaving this we crossed shortly afterwards Wilson Creek, a fine little stream flowing through a rich bottom. It and Kenewaw Run are deeply imbedded below the general surface of the Great Plain of the Columbia, have fine soil and abundant grazing in the bottom and the adjacent hills and upper plains for great numbers of cattle or horses. The scarcity of timber of any kind for fuel and building purposes is, and must always be, a great drawback to the settlement of this section. Keeping on over the part of the Great Plain lying between Wilson Creek and the Grand Coulée, a rich rolling country covered with a luxuriant growth of bunch-grass, we descended by mistake into the Cold Spring Coulée, down which runs the great trail of the Indians from the Spokane country to the Wenatchee and Moses Lake countries. We climbed out of this coulée, and, passing over the broken and rocky summit between the two coulées, we descended by a long gradual slope of about three miles into the Grand Coulée. The Pilot Rock was right above us, on the western bank, to the north. Here in this vicinity is the best place to cross the coulée for a road going east and west. The bottom of the coulée is uneven and more than a thousand feet above the present level of the river. The sides show no water-marks. We went north through the coulée, its perpendicular walls forming a vista like some grand old ruined, roofless hall, down which we traveled hour after hour. The walls are about 300 to 400 feet high. At about seven miles from the river a trail crosses the coulée, and we turned here and went to the west until we struck Foster Creek, down which we kept, following the wagon-road made by the troops which preceded us, to the winter camp, and which crosses the coulée at its junction with the Columbia River.

Some good ranching land lies along Foster Creek, and all over the northern portion of the Great Plain bunch-grass grows in the greatest luxuriance. There are numerous little ponds, which, fed by springs, keep a supply of water all the year, and also numerous springs of excellent water.

Pursuant to instructions from General Howard, Lieutenant-Colonel Merriam and I began a search for the most suitable location for the new post. We examined both sides of the river from the mouth of the Okinakane to Lake Chelan, and decided that the most advantageous sight, taking everything into consideration, was at the outlet of Lake Chelan, the plateau on the north side of the lake and river. An unlimited supply of timber and pure water is at hand and available for every purpose. Lake Chelan is a wonderfully beautiful sheet of water, about sixty miles long, according to the Indians, and from one to five miles wide. It seems to be, and is in fact, a dammed-up mountain cañon of the most rugged and pronounced description. The water is of diamond-like clearness, and yet in places no sight can penetrate to the bottom of its liquid depths. It is supplied from mountain springs and from the melting snows of the mass of snow-capped mountains lying about it.

In a dug-out canoe paddled by old In-na-ma-setch-a, the chief of the Chelans, and his two sons, Colonel Merriam and I went up the lake about twenty-four miles, and found it to increase in rugged grandeur and beauty at every paddle-stroke. Walls of granite rose in places almost vertically for a thousand feet above the waters and down below them farther than the eye could reach. Elsewhere the steep mountain walls were covered with fine pine and fir and dense undergrowth. Game was abundant, as evidenced by the game-trails and the reports of the Indians. At one of our landings Colonel Merriam killed a black bear and saw two others. We were sorry not to be able to go any farther up the lake. It is the most grandly beautiful body of water that I have ever seen. Lying about two hundred and fifty feet above the Columbia, it discharges its waters through a gorge, a cleft-like channel a mile and a half long and only a few feet in width.

After deciding upon the location of the post, I left the temporary camp to go to the

Spokane Falls and Fort Cœur d'Alêne. The country traversed was nearly all rolling bunch-grass land of the richest description, and the most of which will, I believe, be available for raising grain.

WALLA WALLA SECTION.

The Walla Walla section, bounded on the north by the Snake and Columbia Rivers and on the south by the Blue Mountains, is too well known for any description here to be necessary.

YAKIMA SECTION.

The Yakima section is sufficiently described in another portion of this report.

LEWISTON AND MOUNT IDAHO SECTION.

The Lewiston and Mount Idaho section alone remains to be noticed. This is bounded on the north and east by the Clearwater, on the west by the Snake, and on the south by the Salmon River, and although it can scarcely be considered a part of the Great Plain of the Columbia, it is intimately connected therewith.

Denudation has done a wonderful work here. One standing on the highlands to the north of the Clearwater and looking to the south sees Craig's Mountains as a level plain, covered with timber. This plateau of Craig's Mountains has an elevation of 4,300 feet above the sea and 3,000 feet and more above its encircling rivers. The rivers have cut through this elevated plateau, and the local waters have washed it down into gradual slopes toward them. Standing on the eastern edge of this plateau and looking to the east, one can contemplate the almost incredible work that has been done in sculpturing the country to its present form; he can readily see that the plateau on which he stands is a fragment of an immensely greater plateau which at one time extended unbrokenly away to the east, to the distant summit chains of the Bitter Root Mountains, and that the great cañons of the rivers surrounding him, and those seen in the distance, in which flow the many branches of the Clearwater and Salmon, have all been excavated from the plateau on which he stands. Any conceivable time will appear to him too short for the work before him.

Upon the plateau of Craig's Mountain the frosts are too severe to allow of agriculture, but in all the low country about it the soil is of extreme richness. A large portion of the section is taken up by the Lapwai or Nez Percé Indian Reservation. To the southeast of Craig's Mountain lies Camas Prairie, a very fertile region, in which are situated the towns of Grangeville and Mount Idaho.

The only outlet of this Camas Prairie country is by the wagon-road over Craig's Mountain, which is excellent in the summer and autumn, but almost impassable during the winter and spring.

CHAPTER XI.

THE GEOGRAPHICAL NOMENCLATURE OF THE COLUMBIA RIVER REGION.

The subject of the geographical names of a country, their origins, meanings, modifications, changes, loss, and final adoption is one of absorbing interest, especially to the student who wishes to trace the history of his country from its earliest settlement to its full development.

The geographical names in this country of the Columbia are derived from the following sources:

1. Indian names.
2. Names given by the early navigators of Spain, England, and the United States.
3. Names given by the early explorers, as Lewis and Clarke, Bonneville, Fremont, and others.
4. Names given by the early fur traders.
5. Names given by the final and permanent settlers.

In regard to the first of these sources, it is of course highly desirable to retain, as far as possible, the names of places as given by the Indians. This is, however, often rendered extremely difficult, from the fact that the same thing may receive different names from different tribes, or even from the same tribe, and that Indian names often are simply generic, applying to all or many things of the same sort. As example may be cited the different names given to the Willamette by the different tribes living along it; the Snake, also, where it flowed through the Palouse Indian country was called by them the Palouse; where it flowed through the Nez Percé country it was called the Nez Percé, and through the Snake country the Snake.* Indian names are often of such extreme length that people cannot be induced to retain them. Thus the Ne-hoi-al-pit-qua River has become changed, by common consent, into Kettle River, and is so called even by the Indians themselves. The settlers of a country rarely have sufficient regard for their savage neighbors to wish to retain their nomenclature, and the consequence is it is soon completely replaced by one, as a general thing, very unpoetical and commonplace.

The Spaniards have left few names to commemorate their explorations along the coasts of Oregon and Washington. The names given by them, generally in honor of some saint or in commemoration of some church festival, have been replaced by others given by the English and American navigators who succeeded them.

Many of the names given by the early explorers still remain and will continue so to do. Where they are not Indian names they were generally given in honor of some public functionary, or some of their own men, or descriptive of some peculiarity or occurrence.

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* Mullan.

The names given by the early fur traders are chiefly French, as the *voyageurs* were mostly French Canadians, and are, as a general thing, descriptive, as for instance, the *Des Chutes* River or *La rivière aux Chutes*, the river with falls; "*Les Dalles des Morts*," the Rapids of the Dead or Death Rapids, &c. These names have in many instances been changed into their English synonyms, as the *Chaudière* has become *Kettle Falls*.

The names which are finally adopted and live, belong to all the preceding classes and to the last class, or those given by the permanent settlers. The great majority of these latter names refer to some characteristic, and as many places have the same characteristics it results that there are a great number of Willow, Rock, Trout, Mill, Salmon, and Cottonwood Creeks, &c. This multiplication of objects bearing the same name is a great inconvenience at times. Many names are given in remembrance of localities in distant States and foreign lands, as Portland, Albany, Damascus, &c., or in honor of some distinguished citizen of the world, as Colfax, Astoria, Mount Jefferson, Abert Lake, Vancouver, &c. Many are given in honor of the first or some prominent settler in the locality, as for instance Wilson Creek, Prineville, Powell's Valley, Applegate Creek, Ritzville, &c.

Some names show in a high degree the poetical and religious aspirations of those giving them, as for instance Aurora, Zion, Sweet Home, Sublimity, Buttercup, Glad Tidings, Corvallis, &c.

In the works relating to the Columbia region I have found a great diversity in the manner of spelling certain names as well as in the names themselves, and as there have been articles written about some of these names, and the proper mode of spelling them discussed, I give in the following pages such information in regard to them as I have been able to gather.

The proper and complete study of the geographical names of this region would take vastly more time and labor than I have been able to devote to it. It is to be hoped that some one may take up the subject and carry it to completion.

CŒUR D'ALÊNE.

This name, which literally translated means "*heart of awl*," was applied to the Indians living about the lake which now bears this name, by the French *voyageurs* and partners of the Hudson Bay Company. These Indians used to come to Spokane House with the furs which they had gathered to trade. They brought them of such fine quality and in such quantity that the Hudson Bay Company deemed it desirable to establish a branch post among them, and made them a proposition to that effect. To it the Indians replied "No; that their country was so beautiful that when the white men saw it they would want it for themselves; that they were willing to come to Spokane House and trade, but that they did not want the white men to come into their country."

They were, moreover, very sharp and cute at bargaining, and were considered the "*Yankees*" of the Indian race. The whites gave them the name of Cœur d'Alênes, "Awl-hearts," "Sharp-hearts," or "Pointed-hearts," as indicative of their characters as sharpers and cheats at bargaining, and on account of their persistent refusal to allow the white men to come among them. This origin of the name was given me by Father Eells, of the Chemakane Mission. It is about the same as that given by Lieutenant Mullan. Cœur d'Alêne Lake was called by its Indian name of Sketch-hugh Lake, by Alexander Ross.

A. N. Armstrong, a writer on Oregon and Washington Territory, in a book written in 1856, gives the following explanation concerning the appellation Cœur d'Alêne, as applied to the "*Skitsuish* or Cœur d'Alêne Indians":

> Amongst the first traders that visited this tribe was a Canadian of a close, niggardly disposition. The natives were not long in discovering this, and made in their own language a derisive remark respecting him, to the effect that "the white man had the heart of an awl," meaning that he had a contracted, illiberal disposition; the term "awl" being used by them as we sometimes use the word "pin," to denote a very trifling object. The interpreter rendered the sentence "Cœur d'Alêne," greatly to the amusement of the trader's companions, and from that day to this the tribe has been known as the Cœur d'Alêne Indians.

I am inclined to give the latter explanation credence over the former, as it seems to me more reasonable, and from the fact that the early traders did go among these Indians and trade with them, and a mission was established on their lands, to which they did not seriously object.

Ross Cox, one of the first party of the Astorian fur traders to go into their vicinity, and whose book, published in 1832, gives about the first account of the country ever published, says:

> The Pointed Hearts, or, as the Canadians call them, les Cœurs d'Alênes (Hearts of Awls), are a small tribe inhabiting the shores of a lake about 50 miles to the eastward of Spokane House. Their country is tolerably well stocked with beaver, deer, wild fowl, &c., and its vegetable productions are similar to those of Spokane. Some of the tribe occasionally visited our fort at the latter place with furs to barter, and we made a few excursions to their lands. We found them uniformly honest in their traffic, but they did not evince the same warmth of friendship for us as the Spokanes, and expressed no desire for the establishment of a trading post among them. They are in many respects more savage than their neighbors, and I have seen some of them often eat deer and other meat raw. They are also more unfeeling husbands, and frequently beat their wives in a cruel manner.

PALOUSE.

This word seems to be a corruption of the French word *pelouse*—greensward, lawn, &c. It is very descriptive of the country to which it is applied, which is a rolling bunch-grass covered section. It is written "Pelouse" by many old writers. Notwithstanding these facts there is a strong probability that the word from which it is derived is an Indian word. Lewis and Clarke call the Indians inhabiting the country to the north of Snake River in the lower part of its course the Selloat—

pallahs. Pallahs and Palouse are very similar in sound. Alexander Ross, when about to start on a trip after furs, in naming over the Indians with him speaks of a *Palooche*, which is also similar to Palouse. Ross also speaks of the Indians living along Snake River as the Pallet-to-*Pallas*, the Shaw-ha-ap-tens, and the *Paw-luch*, &c. Pallas and Paw-luch both are very similar in sound to Palouse.

The history of the word would then seem to be that it is an original Indian word similar in sound to the French word *pelouse*, which, on account of the early inhabitants being largely French, came to be considered as the original word, and that this, in the course of events, was changed to the spelling now generally adopted, Palouse.

The names by which the Palouse River has been known, as given by different writers whose works I have consulted, are as follows:

Acqua-aye-seep. Indian name. Mullan.
Drewyer's River. Lewis and Clarke.
Pavilion River. A. Ross.
Pavion River. Irving.
Pelouse River. Paul Kane.
Palace or Pavilion River. Paul Kane.
Palouse and Paloose. Mullan.
Pelouse. Steptoe.
Pelouse. Wright.
Pelouse. Pacific Railroad Reports.
Peluse. Pacific Railroad Reports.
Pavilion River. Rev. S. Parker.
Paloose. Armstrong.

SPOKANE.

Whether to put the final *e* on this word has been a much-discussed question, and has divided the people of the Spokane region into two parties. A majority, however, seem to desire the *e*, and so it will finally be adopted, in all probability, and go down to futurity. There seems to be about as much authority for spelling it one way as another. The only clew that I have been able to obtain to the meaning of the word is in the book of Ross Cox, where he speaks of the chief of the Indians of the region as *Illim-Spokanée*, which means the "Son of the Sun." From this, and from the nature of the country in which they lived, it is fair to infer that their tribal name meant something like *Children of the Sun.* They lived principally on the great sunny plains of the Spokane, while many of the neighboring tribes lived in the woody, mountainous regions of Cœur d'Alêne, Pend d'Oreille, Kootenay, and Colville rivers.

I have been told by men long resident in the country that the original word was pronounced with a slight vowel syllable *e* at the end—*Spo-kan-e.* This vowel syllable, indistinct at best, was soon dropped by the busy whites, who love not long names.

In an official Congressional report submitted January 19, 1822, and in one submitted May 15, 1826, the post at Spokane is called Lanton and Lanton. This is probably the same word as Lah-too, mentioned by Mullan as the Indian name of Hangman's Creek.

In speaking of the Astorian trading establishments these reports say: "One of these subordinate establishments appears to have been at the mouth of Lewis River (Fort Nez Percé or Walla Walla, where Wallula now stands); one at Lanton (Spokane House, near the junction of the Spokane and Little Spokane rivers); a third on the Columbia, 600 miles from the ocean, at the confluence of the Wantana River (Fort Okinakane); a fourth on the East Fork of Lewis River (I believe this was on the Clearwater at the mouth of Lapwai Creek, where the Indian agency now is, but I am not certain); and the fifth on the Multnoma (Willamette)."

The following are the methods of spelling the word Spokane, as adopted by different writers:

Spokan	Official transfer papers, Pacific Fur Company to Northwest Fur Company.
Spokan	Ross Cox.
Spokane	War Department map, 1838.
Spokane	Commodore Wilkes.
Spokein	Rev. S. Parker. This writer, who visited the country in 1836, says: "The name of this nation is generally written Spokan, sometimes Spokane. I called them Spokans, but they corrected my pronunciation and said *Spokein*, and this they repeated several times, until I was convinced that to give their name a correct pronunciation it should be written Spokein."
Spokan	Greenhow.
Spokain	McVickar.
Spokan	Nath. J. Wyeth's report, 1839.
Spokane	Robertson.
Spokane	Thornton.
Spokane	A. Ross.
Spokan	Franchere.
Spokan	Irving.
Spokan	National Railroad Memoir.
Spokan	Armstrong.
Spokan	St. John.
Spokane	Pacific Railroad Reports.
Spokane	Mullan.
Spoken	Robertson and Crawford.

OKINAKANE.

I have never been able to determine the meaning of this word. It has been spelled in a great variety of ways, and it is difficult to adopt a spelling which will be satisfactory to all. The above is the spelling as adopted in the Pacific Railroad Survey Reports and the Northern Boundary Survey Reports.

The Okinakane is called the Wantana River in Congressional reports of 1822 and 1826, referring to a military establishment at the mouth of the Columbia.

The following show the modes of spelling the word by different authors:

Otchenaukane	Lewis and Clarke.
Okunaakan	Official transfer papers, Pacific Fur Company to Northwest Fur Company.
Oakinagan	Ross Cox.
Okenakan	Franchere.
Okanagan	War Department map, 1838.
Okanagan	Cushing's Report.
Oknagan	Nathaniel Wyeth.
Oknagen	Nathaniel Wyeth.
Oakenagen	H. J. Kelly.
Okonagan	Commodore Wilkes.
Okanagan	Rev. S. Parker.
Okinagan	Greenhow.
Okanagan	Robertson.
Okonagan	Thornton.
Oakanagan	A. Ross.
Oakanazan	A. Ross.
Oakinacken	A. Ross.
	Ross says Indian name for Okinakane Lake is Sawth-lelum-tak-ut.
Okinikaine	Warner.
Oakinagan	Irving.
Okanagan	National Railroad Memoir.
Okanegan	National Railroad Memoir.
Okinakane	Pacific Railroad Reports.
Okanagan	Paul Kane.
Okinakane	Northern Boundary Report.
Okinakane	Mullan.
Okinagan	McVickar.
Oknanagans	Robertson and Crawford.
Okonagan	R. M. Martin.
Okanagan	Armstrong.

NEZ PERCÉ,

As applied to the Indian tribe, is a misnomer. Lewis and Clarke record their arrival among the Cho-pun-nish or Pierced Nose Indians, *as they call themselves.* No writer has ever accused them of piercing their noses, and it is certain that they never did so except in very isolated cases, if at all. They have been described by a number of early explorers, but this custom has never been mentioned. It is certain that they do not do so now.

FLAT-HEAD,

As applied to the tribe of Indians inhabiting the country about the headwaters of the Columbia and Missouri, is a misnomer. These Indians never were guilty of the deforming habit of flattening the heads of their children. Many writers have described them and none have mentioned the custom, although it has been repeatedly described as being practiced by the Lower Columbia Indians. Their Indian name, as they call themselves, is *Selish*, according to most writers, the meaning of which I do not know.

The Rev. S. Parker, who traveled among them in 1835, says:

> I was disappointed in seeing nothing peculiar in the Flathead Indians to give them their name. Who gave it to them, or for what reason, is not known. The name given them by the Nez Percés, which is *Sailep* does not signify flathead.

COLUMBIA RIVER.

The *Columbia River* was first called the Oregon, from the mention of the name by Carver.

In 1575 it was called *Assumption Inlet*, by Heceta. In the charts of his voyage, soon after published, it was called *Enseñada de Heceta*, and *Rio de San Roque*.

In 1789 it was called Deception Bay, by Meares.

In 1792 Gray called it the *Columbia*. Captain Clarke says that in 1805 the Indians called it the *Shocatilcum*, and another tribe called it *Chockalilum*, both being the same name, differently pronounced, in all probability. This Indian name very probably signifies *Water-friend*, or *Friendly-water*. In the Chinook language *Chuck* signifies water, and *tillicum* friend; hence the name *Chuck-tillicum*, or *Shocatilcum*.

SNAKE RIVER.

The *Snake River* was called Lewis River by Captains Lewis and Clarke. Its Indian name was Saptin, or Sahaptin, Shoshone, Palouse, Nez Percé, or Cho-punnish River, the name varying with the different Indian tribes inhabiting its bordering country.

YAKIMA.

Yakima has been spelled a variety of ways:

Eyakema	Lewis and Clarke's report.
E-yack-im-ah	A. Ross.
Ekama	National Railroad memoir.
Yackaman	Ross Cox.
Yakima	Pacific Railroad Reports.
	Lewis and Clarke's *map*.
Tapatele	Rector and Roberdeau's map.
Tapetelle	Finley's map.
Eyakema	War Department map, 1838.
Eyakema	Robertson.
Yakima	Commodore Wilkes.
Eyakama	Paul Kane.
Yakima	Thornton.

DES CHUTES.

Des Chutes River, called *La Rivière aux Chutes* by Frémont and the early French *voyageurs*, often called Falls River by the early settlers, and finally changed to Des Chutes River. Its Indian name was—

To-wah-na-hiooks	According to Lewis and Clarke.
To-war-nah-cooks	According to Finley's map.
To-war-na-he-cooks	According to Rector and Roberdeau.
Low-hum	According to Alexander Ross.

UMATILLA.

Umatilla has been spelled as follows:

Umatallow	War Department map, 1838.
You-ma-talla	Alexander Ross.
Umatallow	Alexander Ross.
Umatalla	Irving.
Eu-o-tal-la	Irving.
Your-ma-talla	Rector and Roberdeau's map.
Umatilah	Frémont.
Umatilla	National Railroad Memoir.
Umatillah	Mullan.
Umatilla	Mullan.
Umatella	Rev. S. Parker.

HANGMAN'S CREEK.

This beautiful creek took its detestable appellation from the fact that on its banks in 1858 Colonel Wright caused to be hung the Indians captured by him who had been guilty of murder and other crimes.

Its Indian names given by Mullan were Nedlewhauld, Nedwhauld, Lahtoo, or Camas-prarie Creek.

It would be highly commendable to the people of the section if they would change the name from Hangman's to Lah-too or Nedlewhauld Creek.

ROCK CREEK.

In Eastern Washington Territory Mullan says this was known to the Palouse Indians as the Wah-rum, and to the Spokanes as the Oray-tay-ous, and the upper part of it as the Sil-seip-o-vet-sen, or Sil-say-poo-west-tsin.

UNION FLAT CREEK.

Indian name, Smokle Creek. Mullan.

PINE CREEK.

Indian name, Ingossomen Creek. Mullan.

STEPTOE BUTTE.

Named for Colonel Steptoe, who was defeated on the Butte by the Spokane and other Indians, called Pyramid Butte in the Pacific Railroad Reports.

Its Spokane and Cœur d'Alêne Indian name was Se-emp-tee-ta, and its Palouse and Nez Percé name was E-o-mosh-toss. Mullan.

WENATCHEE.

Called—

Wah-na-a-cha, by Lewis and Clarke.

Pisscows, by Alexander Ross.

Pisquouse or Wenatshapam: Pacific Railroad Reports.
Piscous: War Department map, 1838.
Pischous: Commodore Wilkes.
Wainape: Called by some of the Indians, according to Commodore Wilkes. None of the early writers called it the Wenatchee.

METHOW.

Called—
Meathow and Buttle mule-emauch or Salmon Fall River, by A. Ross.
Barrier River: Commodore Wilkes.

LAWYER'S CAÑON AND CREEK.

Named for Lawyer, a head chief of the Nez Percés.

TACOMA.

Tacoma is the Indian name for Mount Ranier, and signifies the *Nourishing breast.* This name was given it probably both on account of its shape and from the fact that it is a great center from which rivers flow in every direction, nourishing the land and supplying fish. This is the name of the highest and grandest mountain in Washington Territory, and it is the hope of many people that when a State is formed of the Territory it may receive the name of TACOMA.

MAP OF THE UPPER COLUMBIA RIVER,

FROM THE INTERNATIONAL BOUNDARY LINE TO SNAKE RIVER,

ON A SCALE OF ONE INCH TO TWO MILES.

25 SHEETS AND AN INDEX SHEET.

FROM SURVEYS AND EXAMINATIONS MADE IN 1881,

BY

LIEUT. THOMAS W. SYMONS, CORPS OF ENGINEERS,
Chief Engineer, Department of the Columbia,

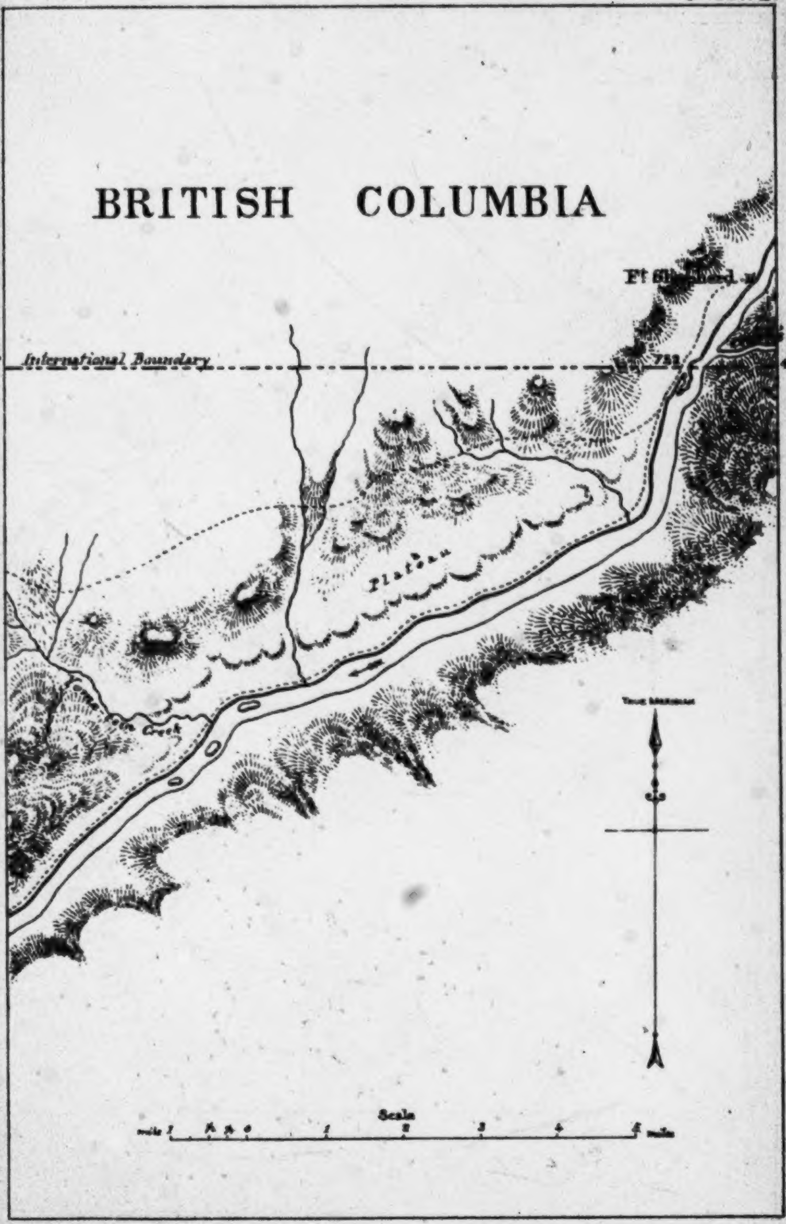
AND

ALFRED DOWNING,
Topographical Assistant, U. S. Army.

Drawn by ALFRED DOWNING.

These sheets are numbered consecutively from the boundary to Snake River, and can be joined together into one sheet if desired, showing the river continuously.

SHEET. 1.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Ft Shepherd
International Boundary
49°
752
49°
Plateau
Creek
True Meridian
Scale
mile 1 ¾ ½ ¼ 0 1 2 3 4 5 miles

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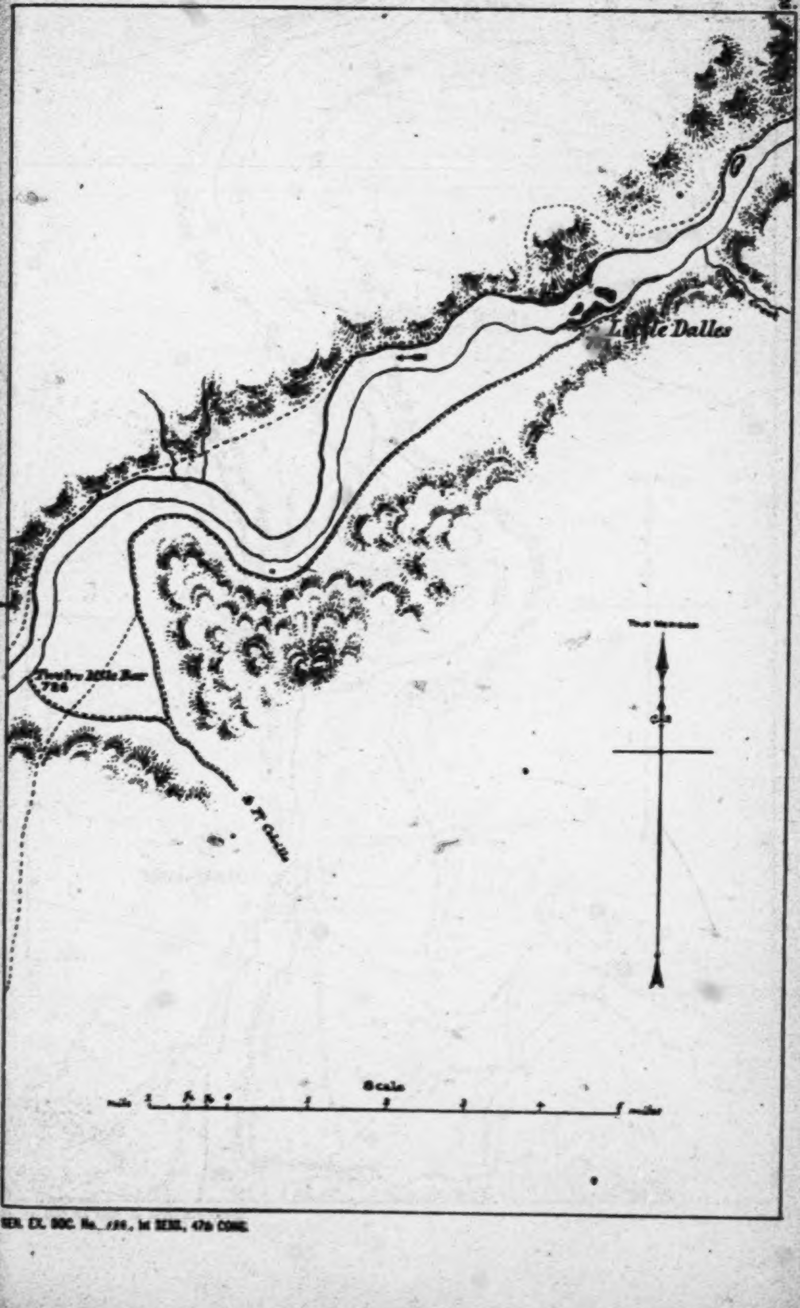
2.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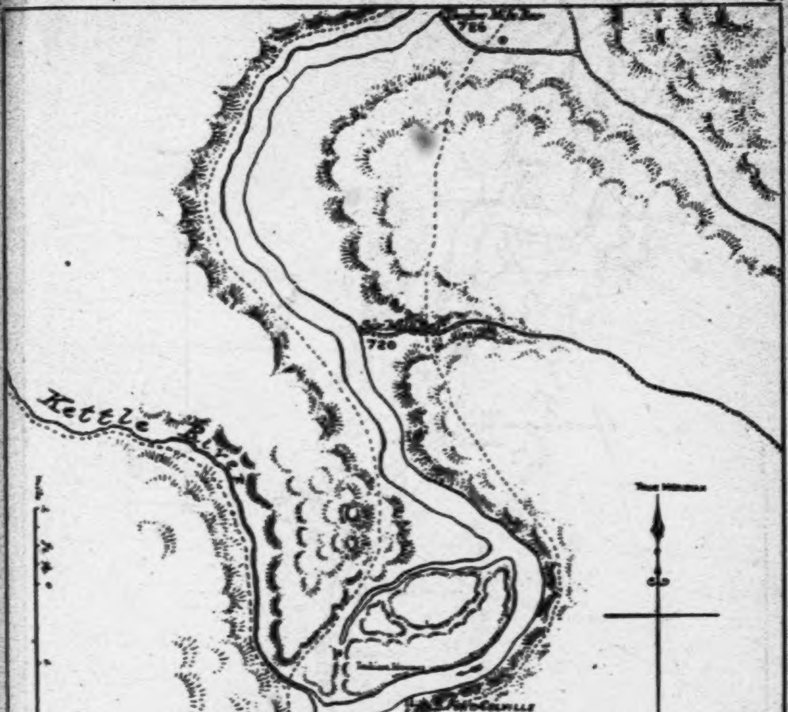
Twelve Mile Bar
726
Ft. Colville
True Meridian
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles

3.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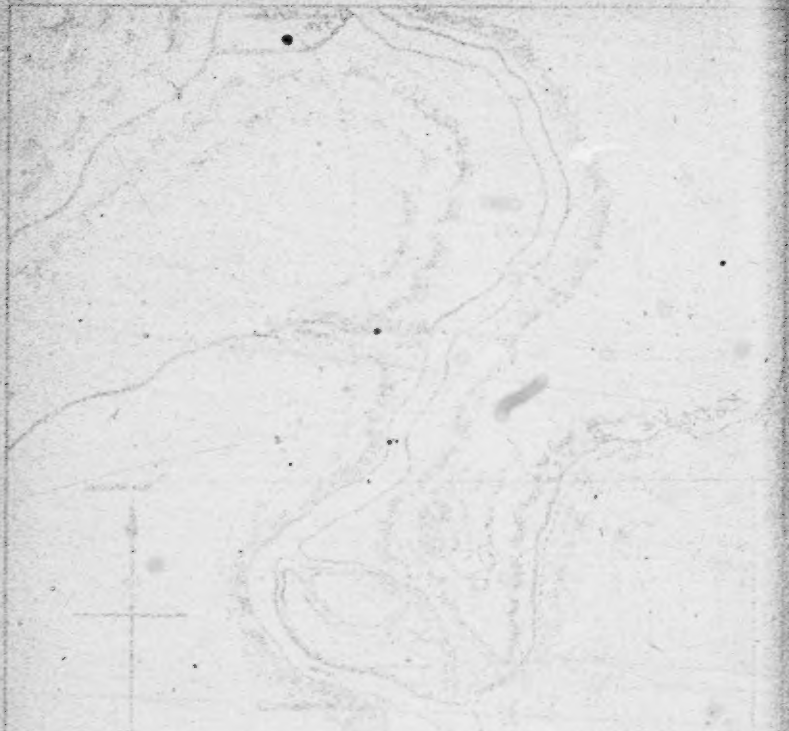
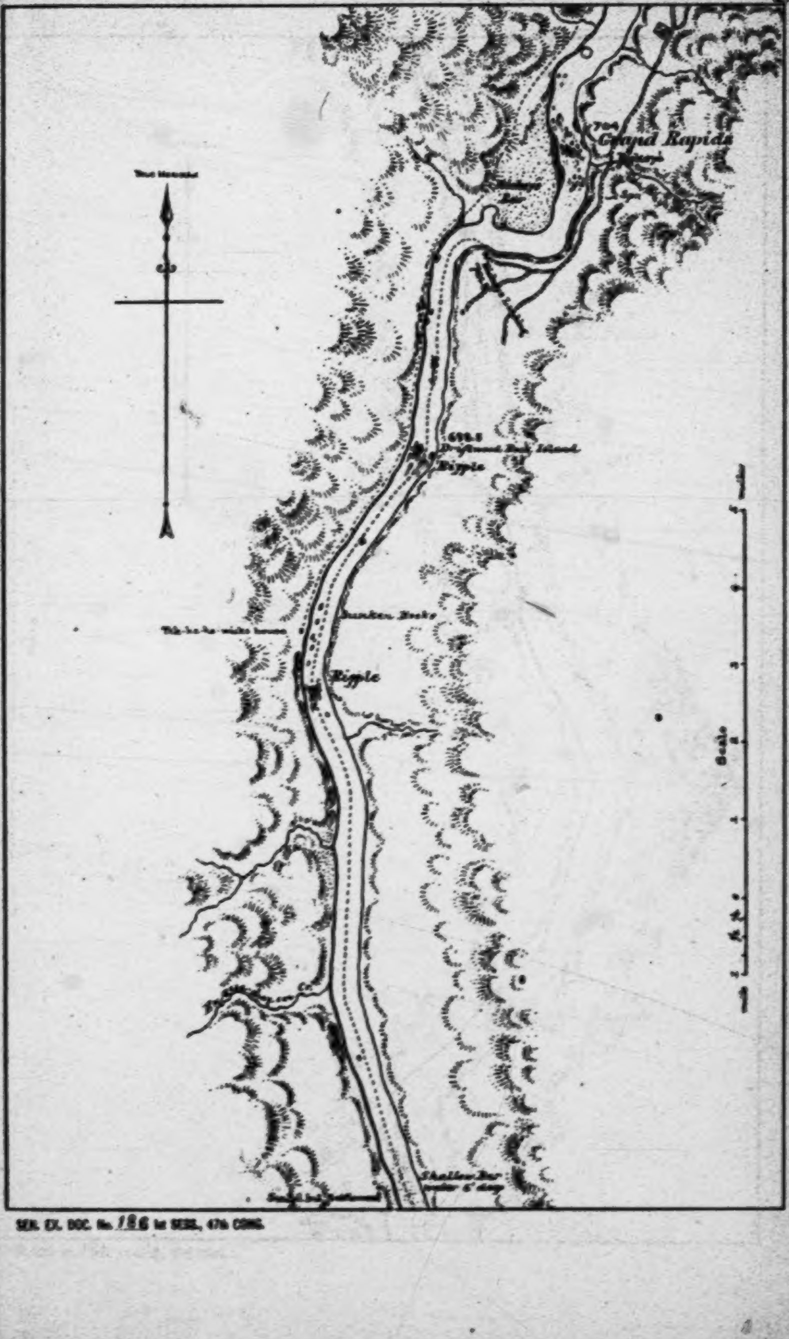
Scale
714
Kettle Falls
Colville River
707

SEN. EX. DOC. No. 186, 1st SESS. 47th CONG.




True Meridian
704
Grand Rapids
698.5
Driftwood Rock Island
Ripple
Sunken Rocks
Ripple
Shallow Bar
water 6' deep
Scale

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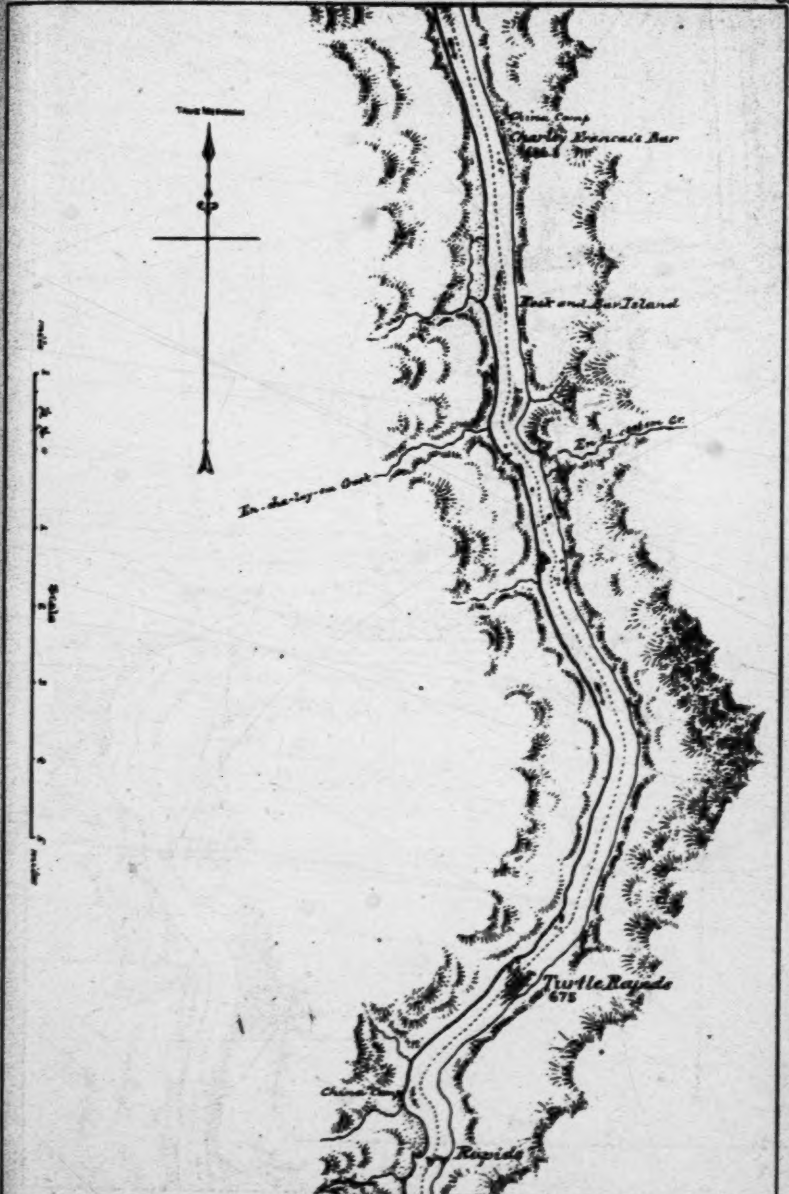
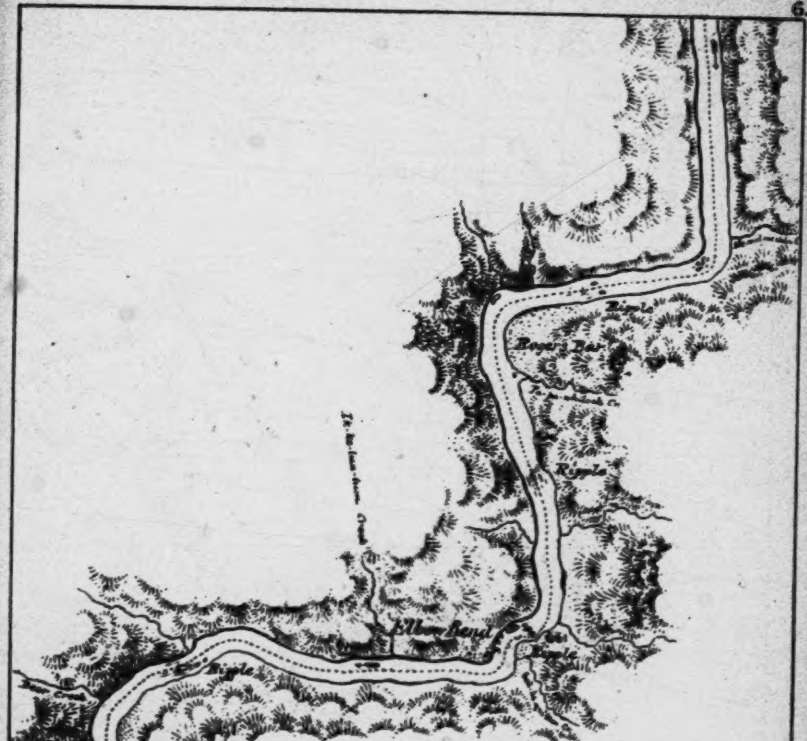
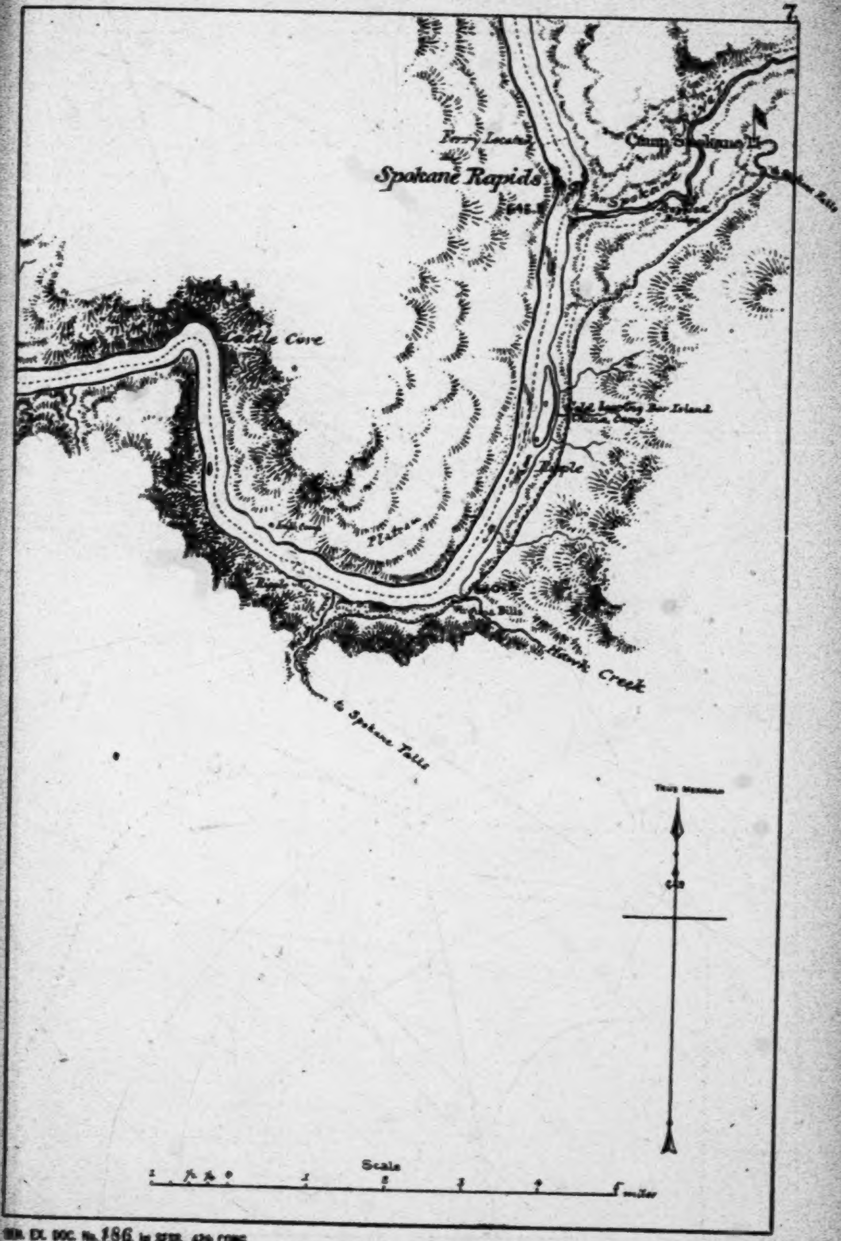
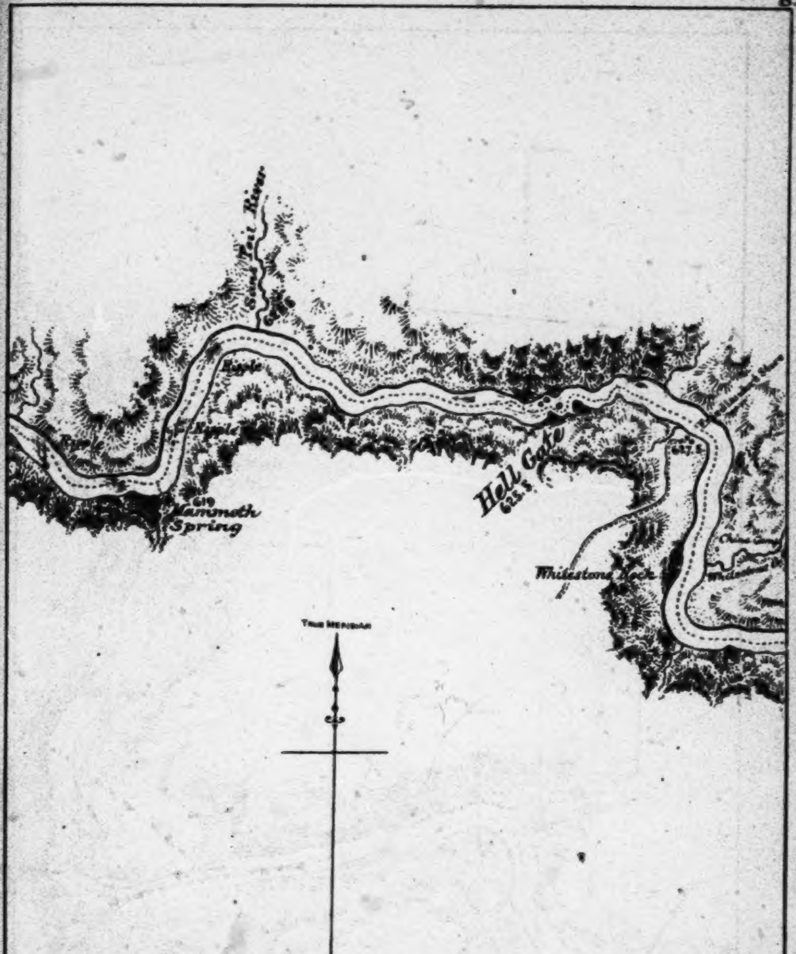

True Meridian
China Camp
Charley Francai's Bar
Rock and Bar Island
En-cha-lay-on Creek
Cr.
Scale
miles
Turtle Rapids
675
China Camp
Rapids

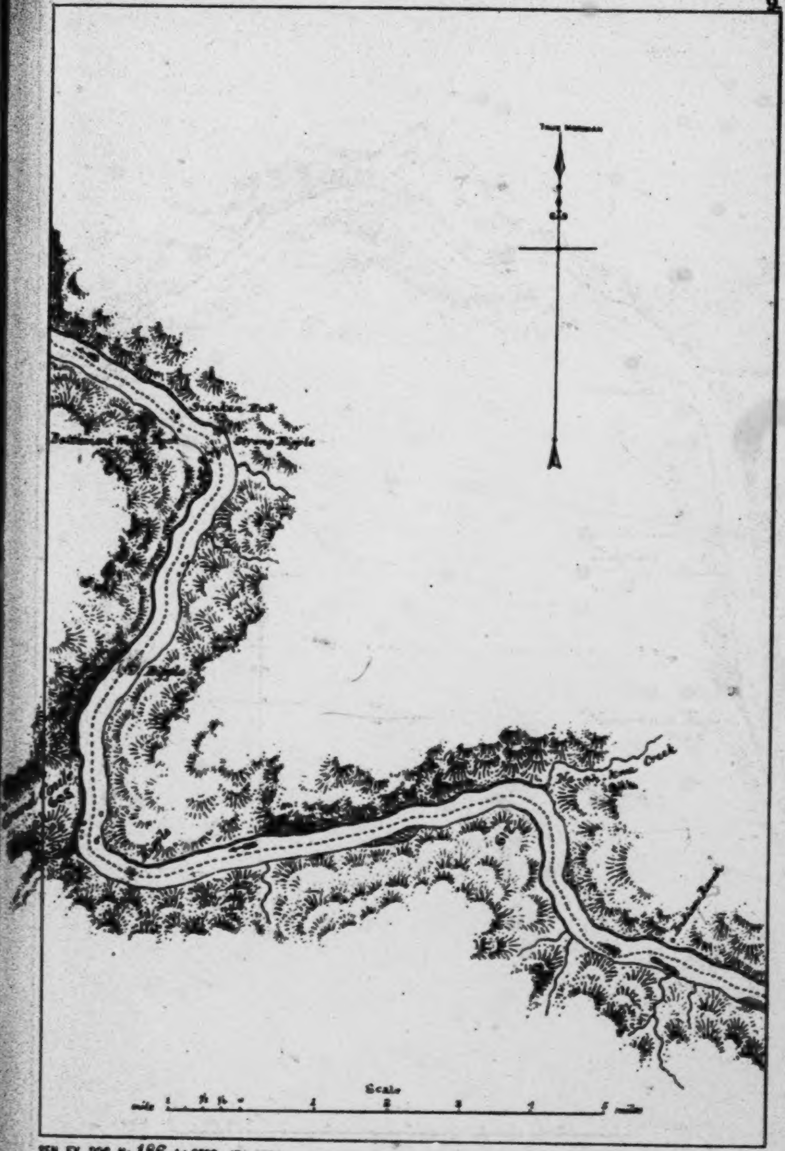
6.


Ripple
Rogers Bar
Ripple
Elbow Bend
Ripple
Ripple
650
Mitre Rock
True Meridian
Scale
1 ½ ¼ 0 1 2 3 4 5 miles

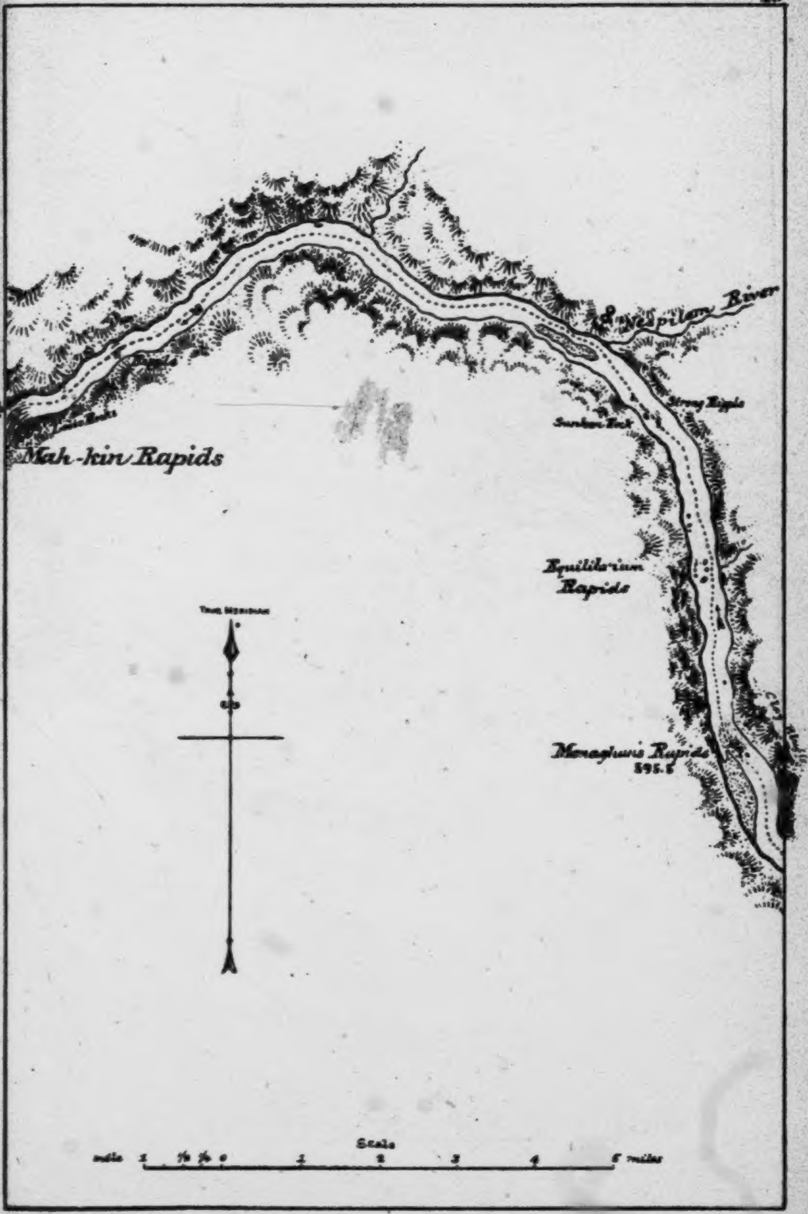
SEN. EX. DOC. No. 186, 1st SESS, 47th CONG.

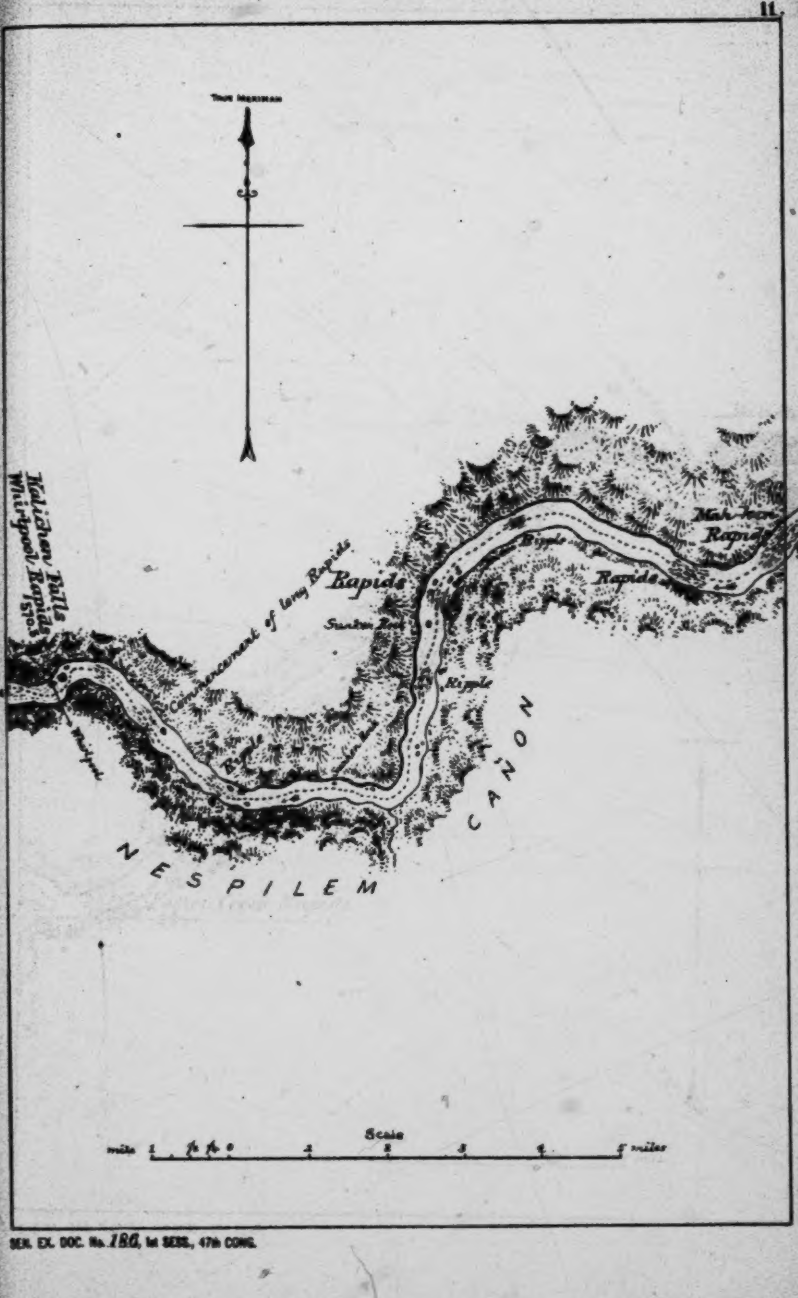

Ferry Located
Spokane Rapids
Camp Spokane
Spokane
Spokane Falls
Castle Cove
Plateau
Hawk Creek
to Spokane Falls
Island
Scale
1
0
1
2
3
4
5 miles

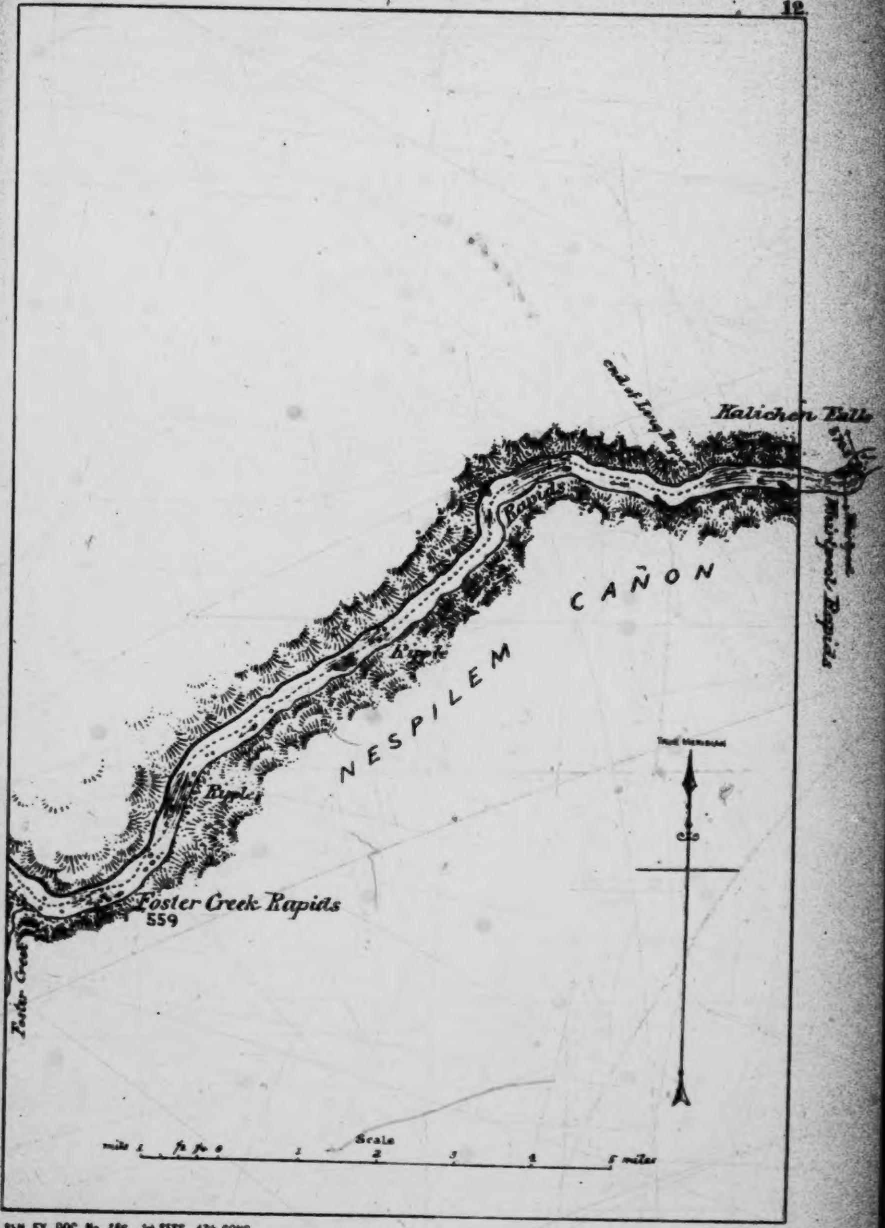

Sand Tail River
Riffle
Riffle
Riffle
619
Mammoth Spring
Hell Gate
625.5
627.5
Whitestone Rock
True Meridian
Scale
mile 1/2 1/4 1/8 0 1 2 3 4 5 miles

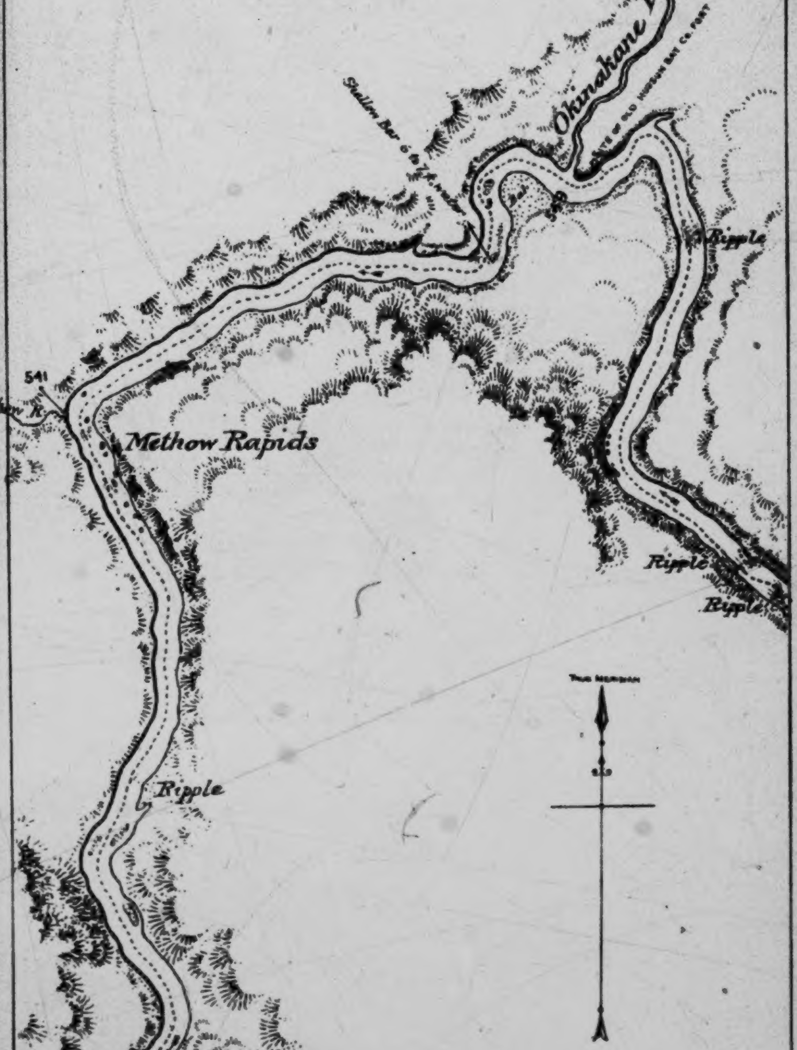

True Meridian
Strong Riffle
Riffle
Creek
Scale
mile
1
2
3
4
5 miles

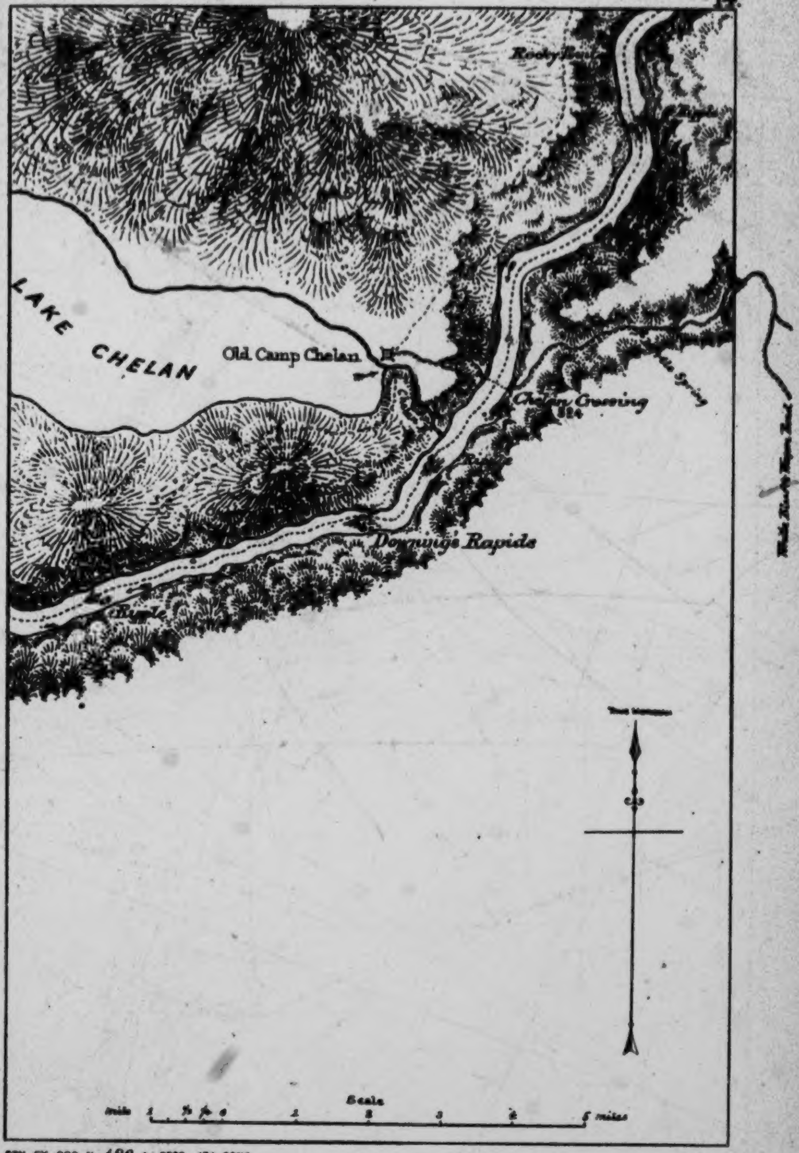
[illegible]


Nespilem River
Strong Ripple
Sunken Rock
Mah-kin Rapids
Equilibrium
Rapids
Monaghan's Rapids
595.5
True Meridian
Scale
mile 1 ¾ ½ ¼ 0 1 2 3 4 5 miles

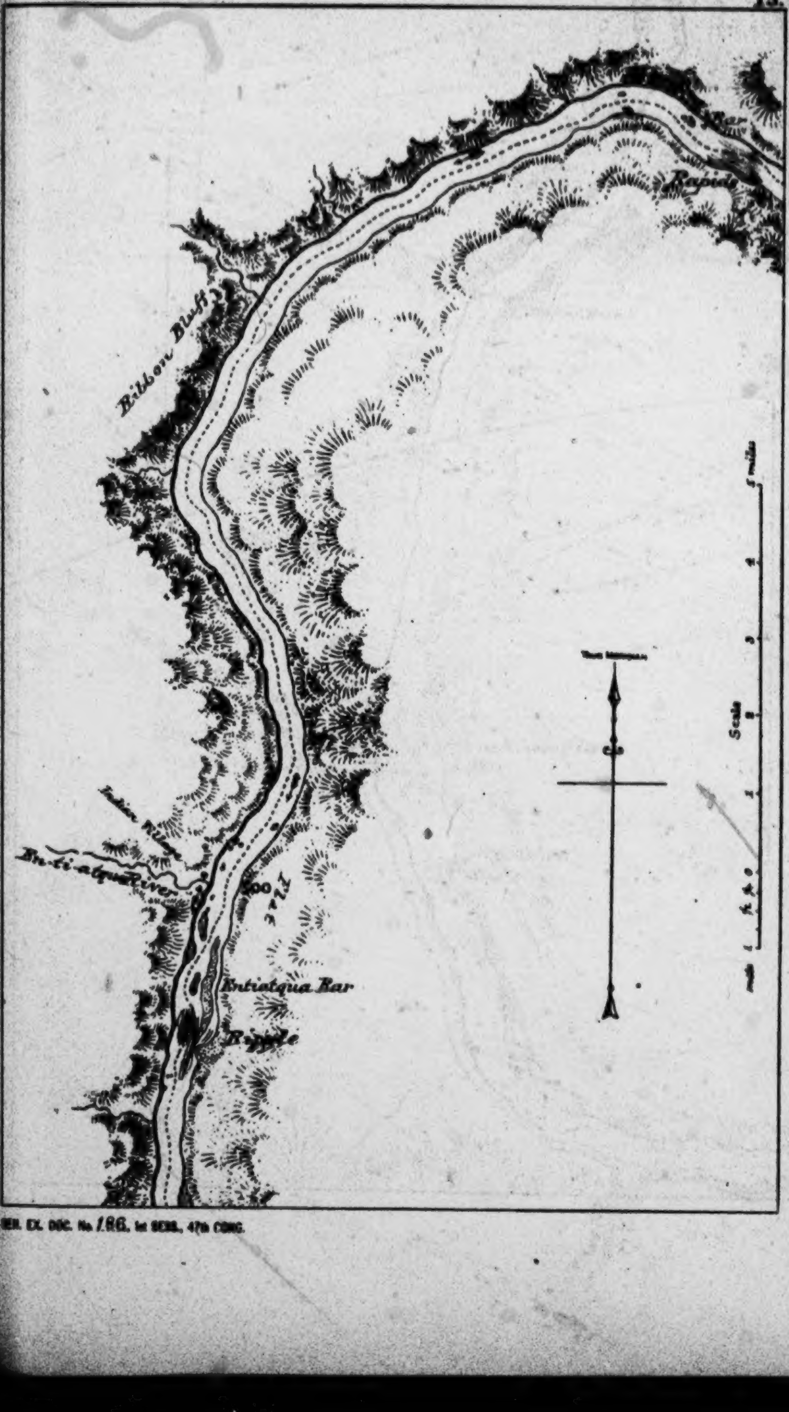

True Meridian
Kalichen Falls
Whirlpool Rapids
570.5
Whirlpool
Commencement of long Rapids
Rapids
Sunken Rock
Ripple
Ripple
Ripple
Rapids
Mah-kon Rapids
582
NESPILEM CAÑON
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles


end of Long Rapids
Kalichen Falls
Moigeak Rapids
Rapids
Ripple
Ripple
NESPILEM CAÑON
Foster Creek Rapids
559
Foster Creek
True Meridian
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles


Okinakane R.
SITE OF OLD HUDSON BAY CO. FORT
Shallow Bar 6 to 7 ft water
Bar
541
Methow R.
Methow Rapids
Ripple
Ripple
Ripple
Ripple
TRUE MERIDIAN
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles


LAKE CHELAN
Old Camp Chelan
Chelan Crossing
824
Spring
Downings Rapids
Rapids
Scale
miles 1 ¾ ½ ¼ 0 1 2 3 4 5 miles

15.


Rapids
Bibbon Bluff
Indian Village
En-ti-atqua River
500
Entiatqua Bar
Ripple
Scale
5 miles
4
3
2
1
0
mile 1

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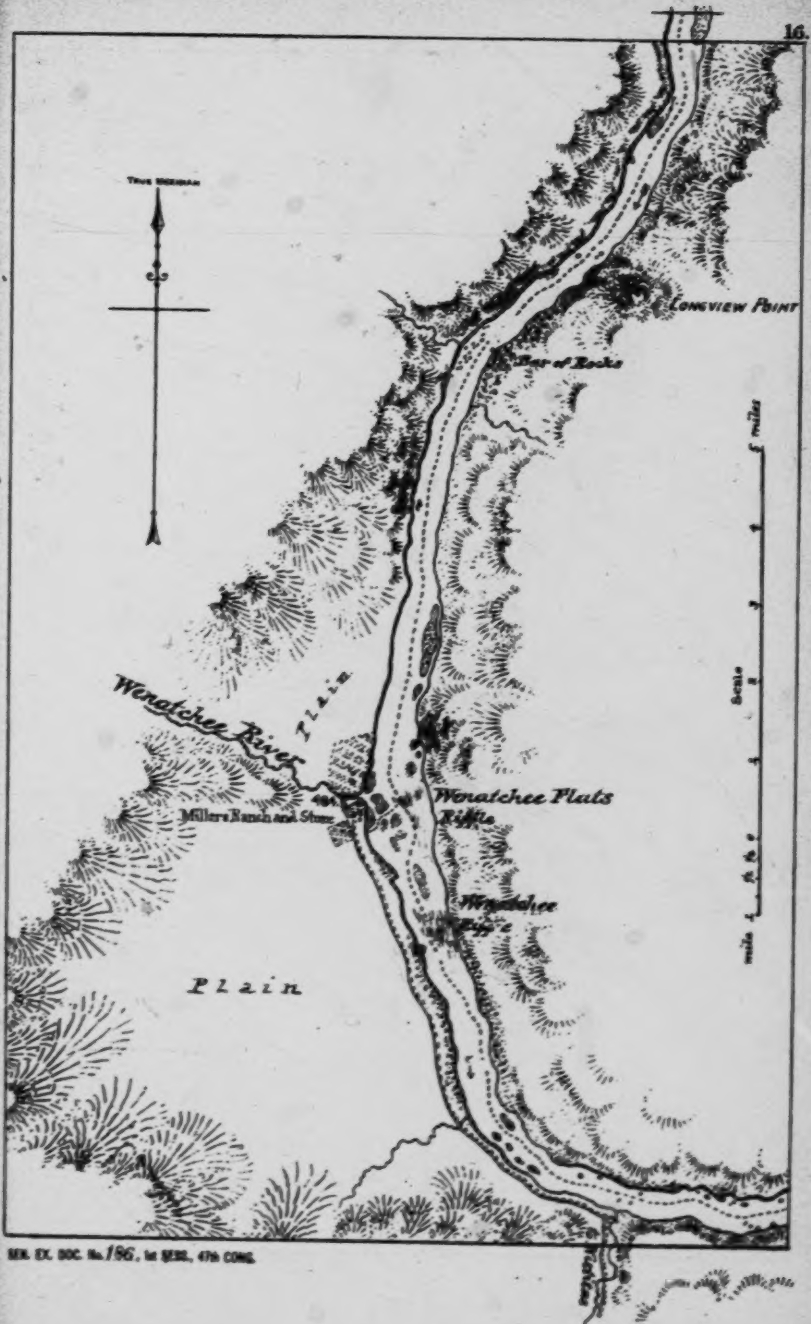
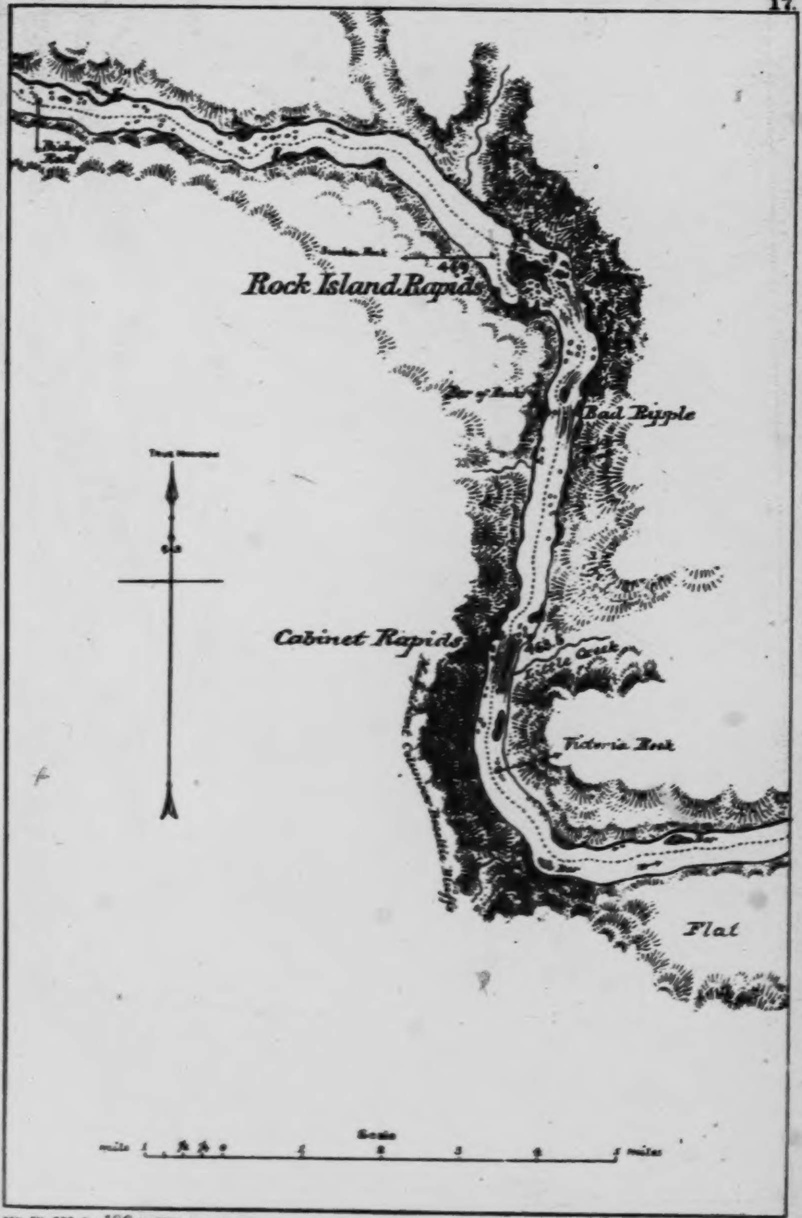
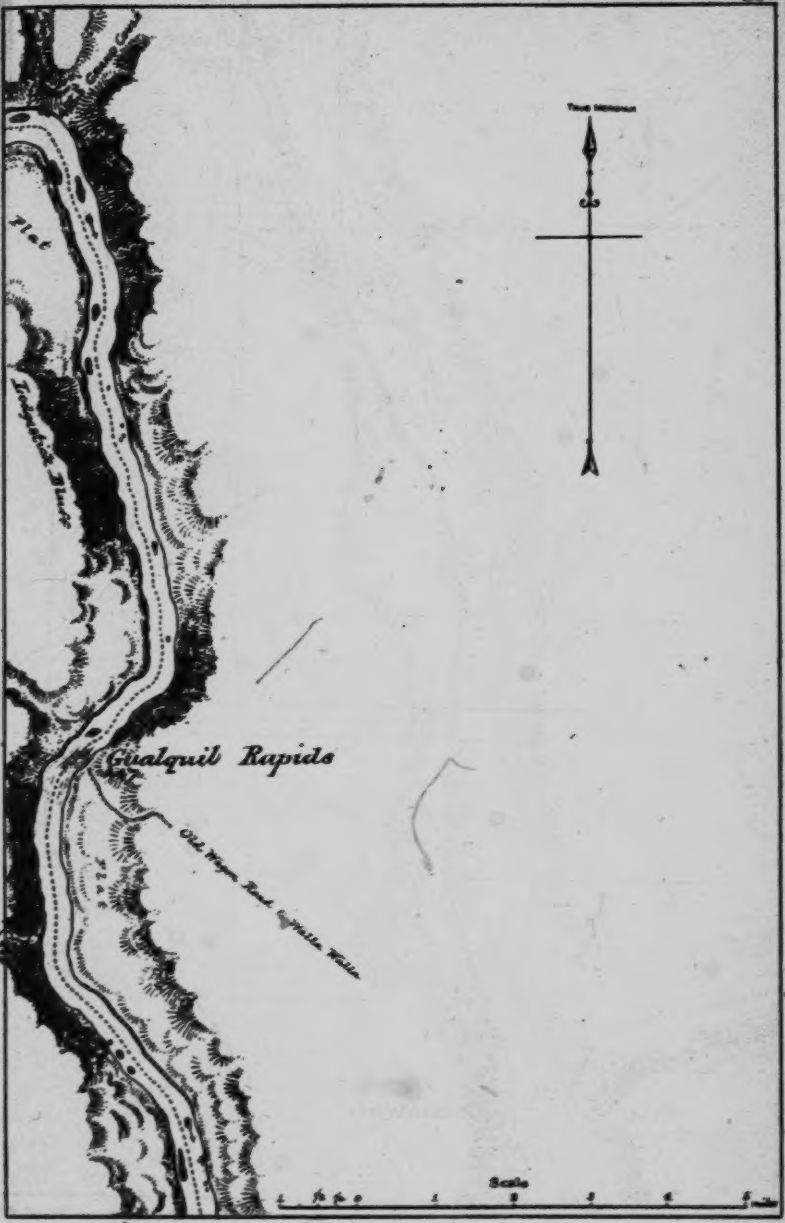
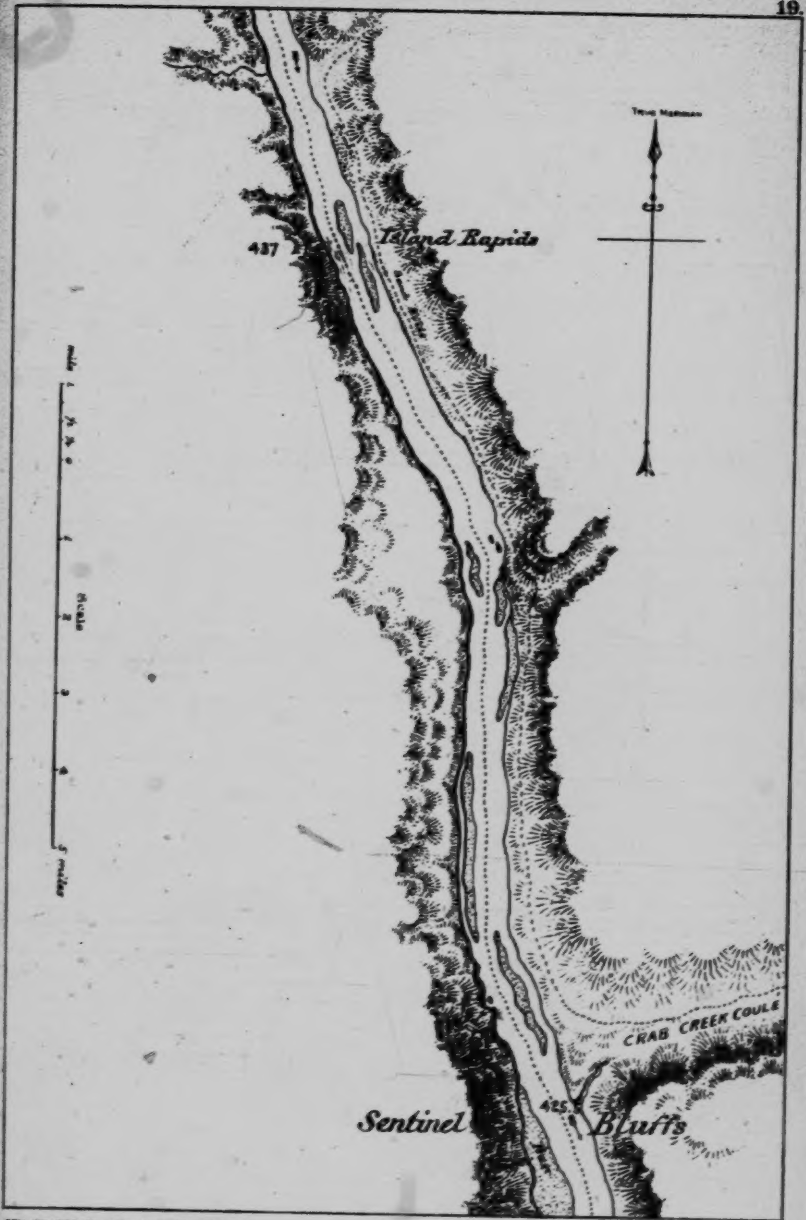
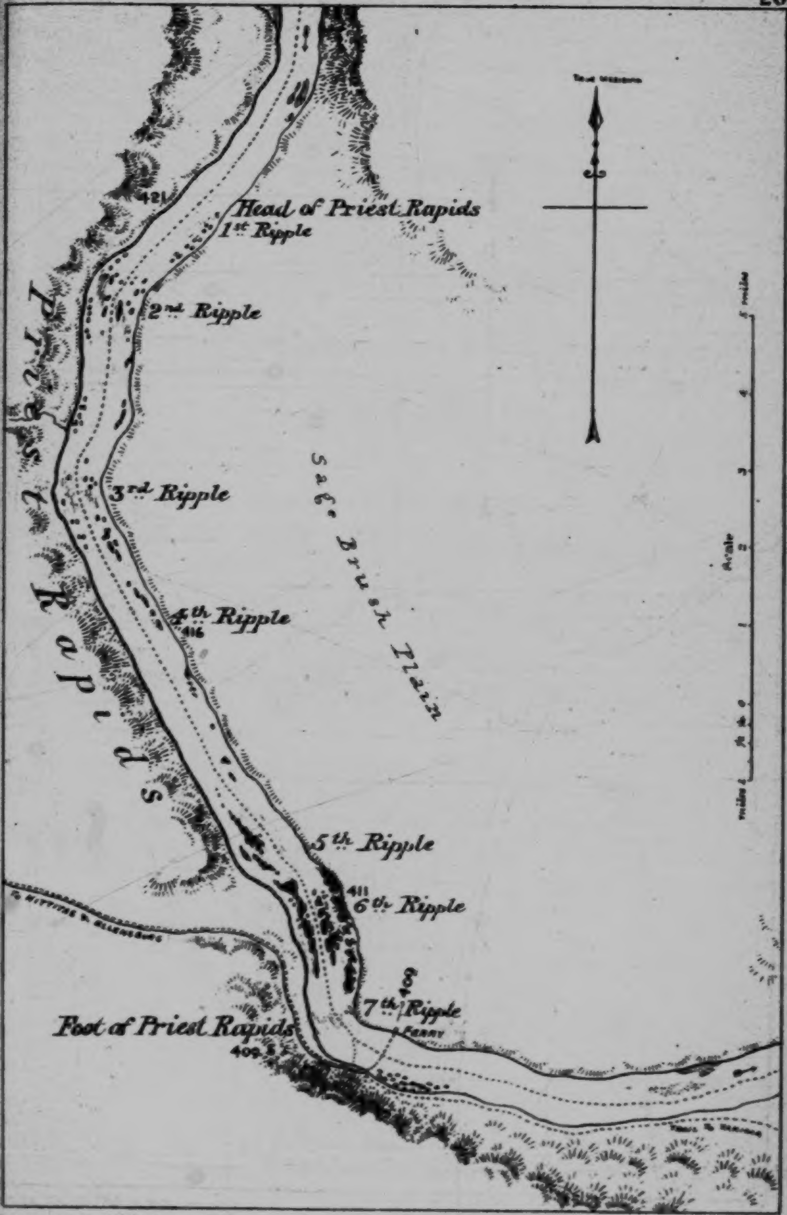
16.

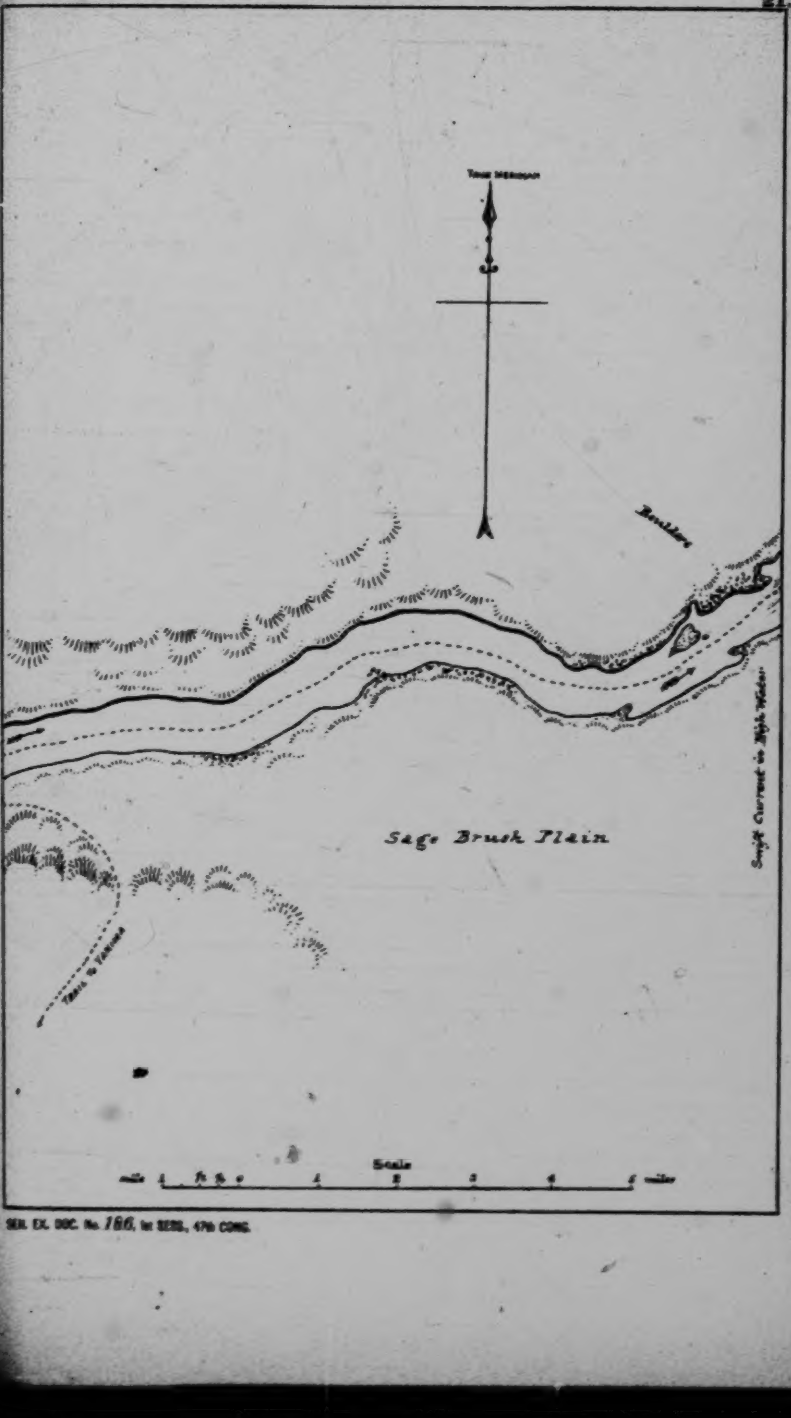

True Meridian
Longview Point
Bar of Rocks
Wenatchee River
Plain
484
Millers Ranch and Store
Wenatchee Flats
Riffle
Wenatchee
Riffle
Plain
Scale
mile ¼ ½ ¾ 1 2 3 4 5 miles


Sunken Rock
449
Rock Island Rapids
Bar of Rocks
Bad Ripple
True Meridian
Cabinet Rapids
Little Creek
Victoria Rock
Flat
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles


True Meridian
Flat
Gualquil Rapids
Flat
Old Wagon Road to Walla Walla
Scale
2
1
0
1
2
3
4
5 miles


Island Rapids
437
True Meridian
mile 1 ¾ ½ ¼ 0 1 2 3 4 5 miles
Scale
CRAB CREEK COULE
425
Sentinel Bluffs


Head of Priest Rapids
1st Ripple
2nd Ripple
3rd Ripple
4th Ripple
5th Ripple
6th Ripple
7th Ripple
Foot of Priest Rapids
Priest Rapids
Sage Brush Plain
421
416
411
409
409
Ferry
Scale
miles
1
2
3
4
5 miles


True Meridian
Boulders
Sage Brush Plain
Swift Current in High Water
Trail to Yakima
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles

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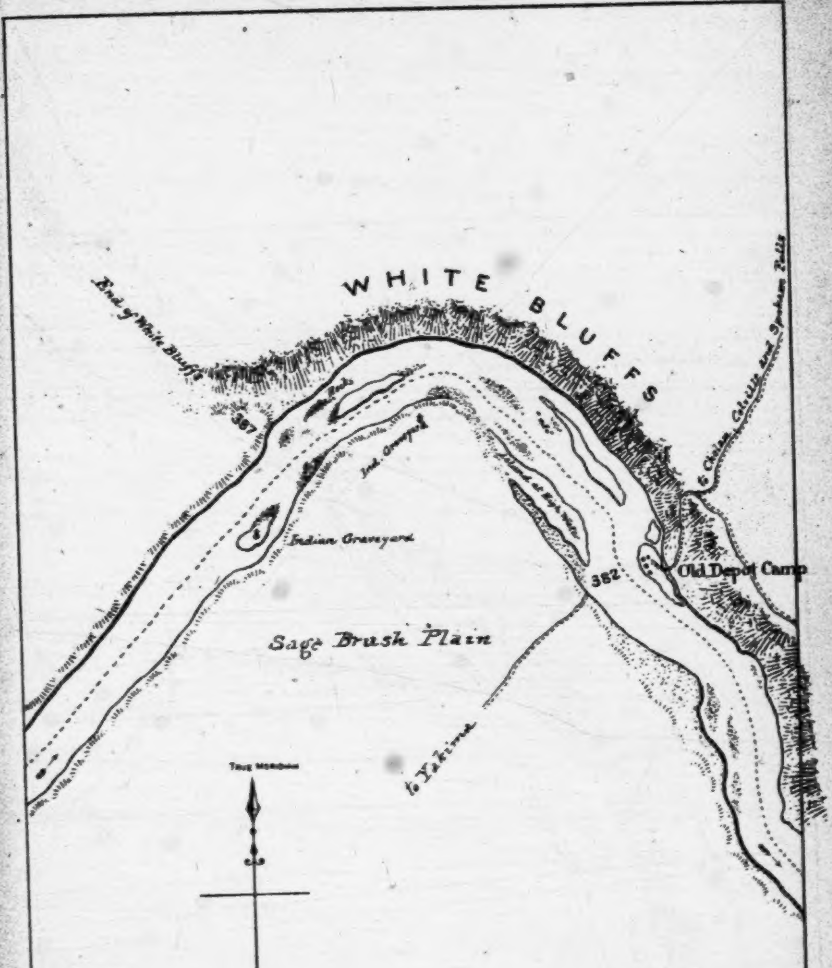
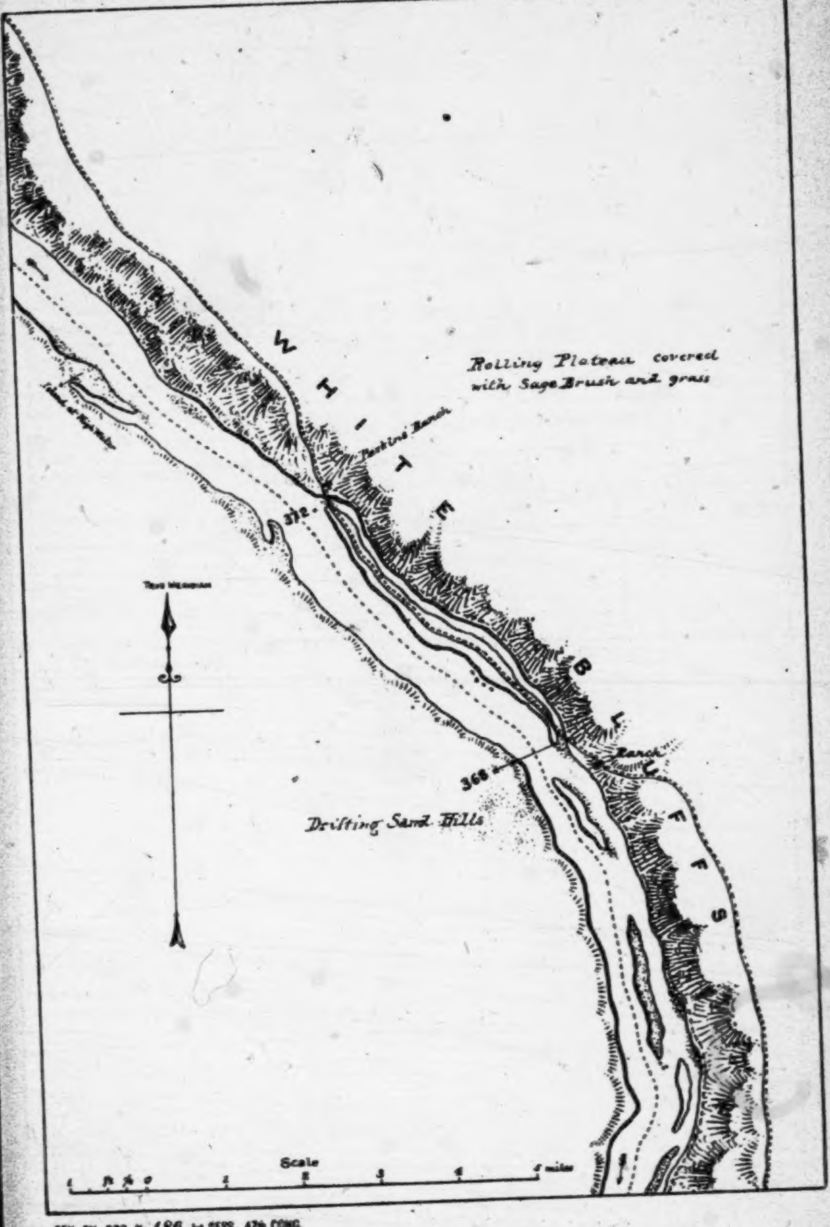
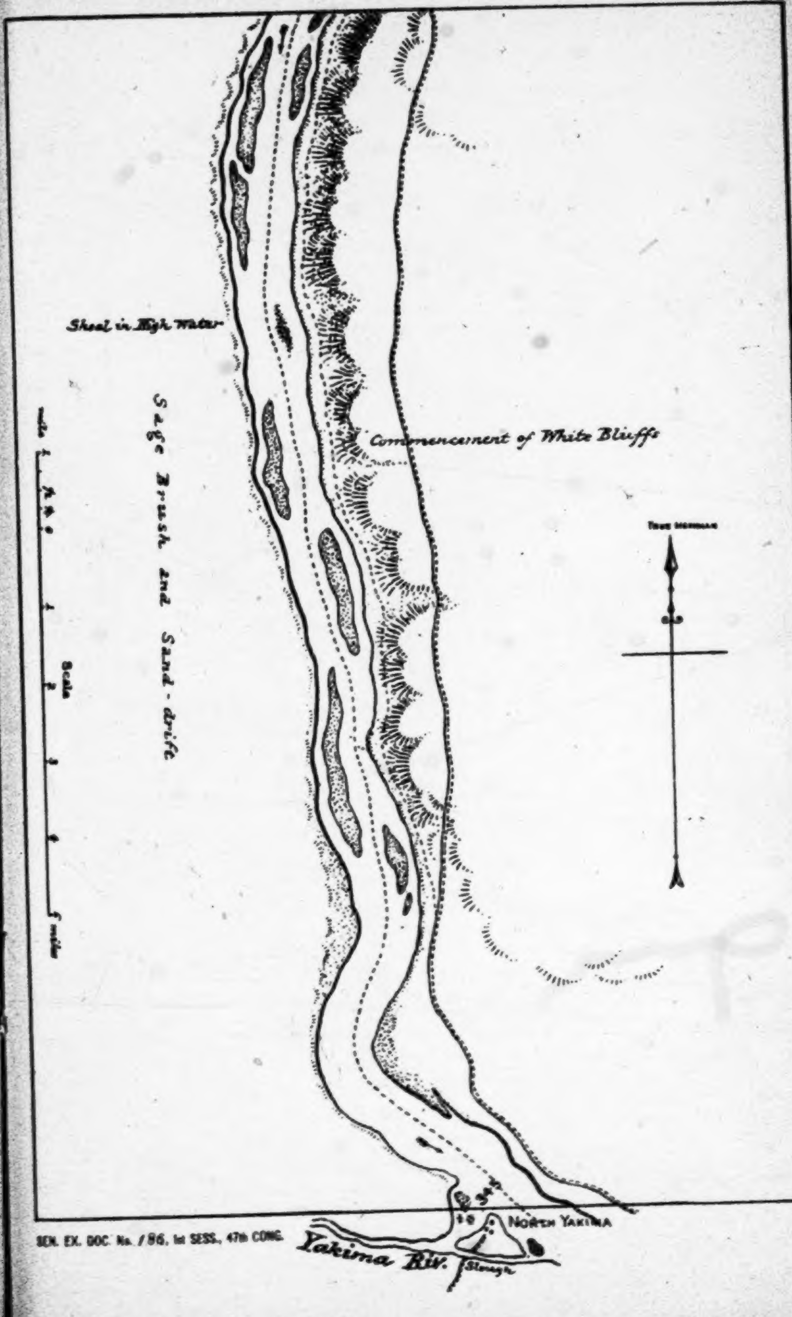

WHITE BLUFFS
End of White Bluffs
387
Rocks
Ind. Graveyard
Indian Graveyard
Island at High Water
382
to Chelan, Colville and Spokane Falls
Old Depot Camp
Sage Brush Plain
to Yakima
True Meridian
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles


WHITE BLUFFS
Rolling Plateau covered with Sage Brush and grass
Island at High Water
Perkins' Ranch
372
368
Ranch
True Meridian
Drifting Sand Hills
Scale
1 ½ ¼ 0 1 2 3 4 5 miles


Shoal in High Water
Sage Brush and Sand-drift
Commencement of White Bluffs
TRUE MERIDIAN
Scale
mile 1
0
1
2
3
4
5 miles
NORTH YAKIMA
Yakima Riv.
Slough

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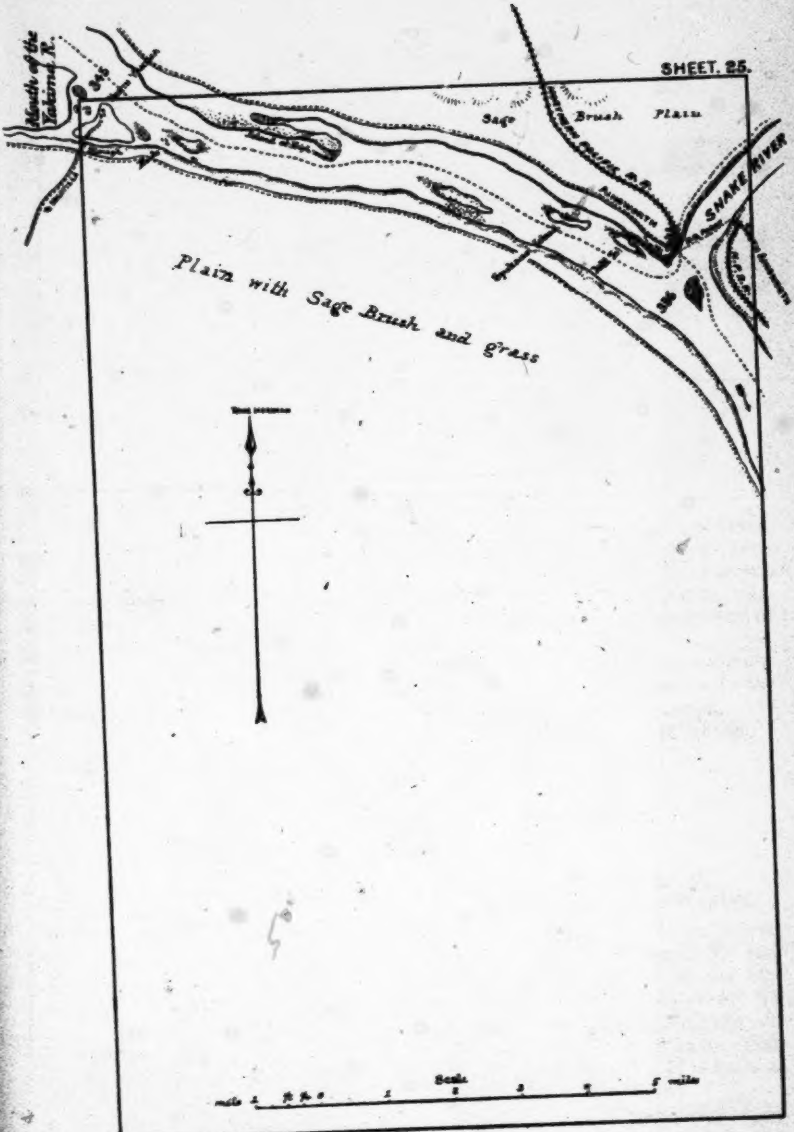
SHEET. 25.


Mouth of the Yakima R.
345
Sage Brush Plain
SNAKE RIVER
Ainsworth
Plain with Sage Brush and grass
Scale
mile 1 ½ ¼ 0 1 2 3 4 5 miles